NOVEMBER/DECEMBER 2002

FAA Aviation news

AVIATION SAFETY FROM COVER TO COVER

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BACK COVER: Knight Twister, *the 1999 Oshkosh Reserve Grand Champ. (H. Dean Chamberlain photo)*

Winter Cometh

story and photos by H. Dean Chamberlain

As you read this last issue of 2002, *FAA Aviation News* wants to remind those of you who have not prepared yourselves and your aircraft for winter flight ops, time is running out. For some, time has run out. For those of you and your aircraft basking in the sunshine and warm temperatures of the Sunbelt or the islands, please bear with us.

At the beginning of this year, January 10, there was an interesting search and rescue story that highlighted why each year we remind everyone about preparing for cold weather operations. According to CNN's datelined story from Purgatory, Colorado, "A sightseeing plane pilot survived two crashes in the snowy Colorado Rocky Mountains after his plane crashed with two passengers aboard; he went to get help, and returned in a rescue helicopter that also crashed. All passengers on each flight survived."

According to the news story, the two injured survivors of the Cessna 172 (C-172) spent a freezing night waiting for their pilot to return with help. The pilot had walked six hours through snow until his cell phone worked so he could call for help. Then while helping the U.S. Air Force rescue helicopter find the C-172 crash site, the rescue helicopter crashed. This was crash number two for the Cessna pilot in two days. The Cessna had crashed on the ninth. The helicopter crashed on the 10th.

As a safety magazine, we are commenting on this story because it highlights the importance of being prepared for winter survival, or in this case, the risks of not being prepared. CNN reported neither passenger was wearing winter clothing. One was wearing shorts. The aircraft did not have survival gear or blankets onboard. The reported temperatures the night of the Cessna crash were teens to low 20s. A member of the sheriff's department was quoted as saying any time anyone survives a plane crash, it's remarkable, but it's even more remarkable in the Rocky Mountains in the winter.

Like many accidents, the flight reportedly started out as a short sightseeing flight. We are using this story to show that no matter where you live and fly, even a short sightseeing flight can have dangerous consequences.

FAA Aviation News has repeatedly said that pilots and passengers should dress to be able to walk home from any flight. Since by definition, an accident is an unplanned event, this means every flight should include the possibility of a walk home. It may be a remote chance, but the chance exists as this case proves.

Some areas of the U.S., such as Alaska, have specific survival equipment requirements. Most areas leave it up to the pilot to determine what, if anything, to carry. Just like when driving your vehicle down an isolated snow-covered country road late on a cold winter night, it is better to wear your winter coat than to throw it in the

back seat and depend entirely on your vehicle's heater to keep you warm. The reason is if you skid off the road and into a ditch injuring yourself, how will you keep warm when the engine dies? What will you do until help can find you? The same is true in an aircraft. If you can't reach your survival gear or winter clothing because of injury or you are trapped in your seat and can't reach the items, you are out of luck. As we noted in our article on desert survival this summer, you need to keep important survival items within reach. This is not to say you shouldn't properly secure them. The last thing you want in a crash is a loose object flying around the cabin.

One of the best ways to avoid landing out in the boonies or on a remote mountaintop is to make sure your aircraft is properly prepared for winter. Your aircraft's operating manual lists those things you need to do to prepare the aircraft for winter ops. From making sure the proper weight oil is installed to checking the battery to checking the fuel system for water—read potential ice cubes in your tanks and fuel lines when the temperature goes below freezing—to checking your control cables for proper tension to checking your oil cooler's cold weather operating requirements, you have a lot to check before the thermometer takes its annual nose dive. If you live in areas where the temperature has already headed south for the winter, you should have already completed your winter checklist. You did winterize your aircraft? If you have any questions about what has to be done to prepare your aircraft for cold weather ops, your first stop should be your pilot operating handbook. Your aircraft service manual also outlines the steps to take. If you have more questions, you should ask the maintenance professional who works on your aircraft. FAA also publishes information on winter procedures. An Internet web search can provide a wealth of information. Your local Flight Standards District Office's Safety Program Manager is also a valuable resource. Obviously, if your aircraft is relatively new, your aircraft manufacturer is your best resource. If you have an older aircraft, the type club for your specific brand and model of aircraft is another important resource. If you don't know how to contact your respective type club, most clubs, such as the Cessna and Piper clubs, are listed on the Internet. Another important resource is your local Experimental Aircraft Association chapter. Most smaller airport fixed-based operators have some type of bulletin board with local chapter information. If not, again check the web.

FROST AND ICE

It goes without saying that frost and ice on your aircraft can ruin your whole day. You should never take off with frost on your wings. Aircraft wings don't fly well with frost on them. The same is true of ice. If your aircraft is not certificated for flight in known icing conditions, it is important to stay out of such conditions. Any time there is visible moisture and below freezing conditions, there is the possibility of icing if you penetrate the moisture. Although frost can reduce or destroy lift,

ice's danger is twofold. Ice build up not only can reduce or destroy lift, but it also adds weight. Combined, both can make it difficult or impossible to maintain altitude or continued flight in aircraft not approved for such operations. Even those aircraft approved for flight in known icing conditions have limitations. In severe icing conditions, ice can build up so fast that the aircraft's deicing or anti-icing systems can't keep up with the buildup.

This is why all pilots should have an escape plan if they inadvertently start to pick up ice or the build up is greater than their aircraft can safely handle. Whether it is knowing the altitude of warmer air or where they can fly out of the icing conditions, pilots should have a plan. Part of that plan is knowing when to ask air traffic control (ATC) for help. Declaring an emergency is always an option. In reviewing accident reports, it is always better to ask ATC for help before the situation becomes critical, than it is to wait until it is beyond ATC's ability to help. It goes without saying, you need to know how and when to use your aircraft's anti-icing and deicing systems. In case of ice buildup en route, follow your aircraft's operating manual's recommendations about landing speeds. You may want to carry extra speed during landing if the field length permits.

ICING IS NOT THE ONLY RISK FACTOR IN WINTER OPS

Not only is it important to make sure your aircraft is prepared to operate in winter flight conditions, but a recent National Transportation Safety Board report noted pilots flying in mountainous terrain before official sundown may experience night conditions in the valleys because of terrain masking of the sun. This condition highlights the importance of being night current when flying near sundown in mountainous areas. Although sun masking is not a problem in the flatlands of the Midwest, pilots in those areas need to be just as night current because of the limited amount of daylight hours during the winter months.

Nighttime can be a very enjoyable time to fly for those who are prepared. Current charts, airport data including airport operating hours, knowledge of minimum altitudes, and a spare flashlight are a few of the important tools to have onboard for a winter night flight.

Instrument pilots who are current and proficient have an inherent safety advantage when flying at night if they are operating on an IFR flight plan. Their charts provide them safe operating altitudes and guidance as long as they follow the published procedures.

COLD WEATHER PREFLIGHT

In addition to limited hours of daylight, another human factor element you need to think about is how

are you going to do a thorough aircraft preflight. For those pilots with heated hangars this is not as critical an element, but for those pilots whose aircraft are tied-down outside, it takes a disciplined pilot to do a complete and thorough preflight when the temperature is below freezing and the wind and snow are blowing. The urge to kick the tires and jump into the aircraft must be controlled. Add in some darkness and the urge to just fire up the engine can become overwhelming.

Adding to this risk of trying to get out of the cold is trying to avoid a complete aircraft preheating which includes the engine and cockpit area. Failure to properly preheat an aircraft can result in additional wear on the engine, a chance to rundown the battery, and cockpit instruments not operating properly. In addition, some pilots may try to reduce their cold exposure by taking shortcuts when preflighting their aircraft. They may even decide not to properly de-ice their aircraft or remove all of the frost, snow, or ice contamination on it.

Although heated hangars are great in the winter, remember that moving a warm aircraft out of a heated hangar in near or below freezing conditions can cause any falling snow to melt which later might freeze if the temperature is below freezing at altitude. Controls may freeze or wheels may freeze up in the wheel wells. The same can happen if rain, water, or slush is encountered on the ramp or runway before takeoff in near freezing conditions.

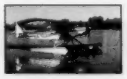
The following are some things that pilots should be aware of when preflighting their aircraft in freezing temperatures. Pitot heat should be checked before every flight. Then there is the chance water may have frozen at some point in the aircraft's pitot system. You should have a plan in case the pitot becomes blocked. Although aircraft will fly with a blocked pitot system, pilots have had accidents when a blocked pitot system caused a loss of indicated airspeed. The old formula of power plus attitude equals performance will keep an aircraft flying when indicated airspeed is lost. The loss of an airspeed readout is no reason to have an accident. In addition to possible pitot system blockage, pilots should check for possible induction air cleaner blockage. The air cleaner may have collected some moisture which could freeze and block the system. Carburetor heat, if applicable, and windshield defrost should be checked for proper operation. For those aircraft with embedded electrical wiring window heating, you need to following the operating instructions to avoid damaging the window. As the temperature drops, you may want to give your gyro instruments extra time to come up to speed. This is why it is helpful to preheat the cockpit in addition to the engine. Finally, if your aircraft has liquid crystal instruments, you need to follow the manufacturer's instructions to ensure proper cold weather operation.

WINTER CROSS COUNTRY

If you are one of those pilots who fly between cold to hot or hot to cold areas of the country, you need to pay special attention to your aircraft. If you are planning on flying say from North Dakota to Arizona or Maine to Florida in January and you have winterized your aircraft, you need to remember to review your operating conditions before your flight to make sure your aircraft will not let you down. If you have installed a winterization kit, you may have to remove it. If you have an oil cooler baffle installed, remember to remove it to keep your oil temperature within the approved range. If you are flying from a warm area to a cold are you may have to install a winterization kit at some point. You may have to change oil depending upon the temperature operating range of the oil you have installed. These are only some of the things to consider when making a long cross-country trip out of your local flight area. Your departure, en route, and your destination conditions all need to be considered to make sure your aircraft is operated within its limitations.

RECAPPING

Quickly recapping, you and your



aircraft need to be prepared for winter flight operations if you live and operate in snow country. That means winterizing your aircraft, knowing how to properly start the aircraft in low temperatures, and updating your flying skills.

Although we could continue outlining things to do, we want to end this short article by reminding everyone of the need to be careful when landing on snow-covered runways or where braking is suspect. More than one aircraft has ended up off the runway when the aircraft hit a patch of ice while landing. Recently, in a discussion about how airports report runway braking, it was brought out how different types of aircraft and braking systems can handle different runway conditions. Just as in reporting turbulence, what may be light turbulence to one type aircraft may be moderate or severe to a smaller aircraft. The same is true of reported runway conditions. You need to be able to translate the reported conditions to your aircraft and its braking system. You need to have a plan in mind in case you can't stop on the runway. Knowing when a situation is starting to get out of control is the first step in initiating a successful go around. The old adage, when in doubt go around, applies.

Finally, if you get stopped on a snow-covered runway, be careful taxiing to the ramp. More than one aircraft has missed a turnoff and ended up in the grass or hit a snow-covered light fixture or snow bank along a plowed runway or taxiway. Another danger of snow-covered runways and taxiways is the fact snow can cover critical markings. In one case, a pilot was involved in a runway incursion incident because a hold-short line was covered by snow. The flight's not over until the aircraft is secured and your flight plan is closed. You did file a flight plan? An activated flight plan is your best friend in case you need help. Flight plans are free: Please use them.

It is a long winter. Have fun and fly safely.

WINTER SURVIVAL KIT INFORMATION

1. Compass (aircraft compass is a backup)
2. Clothing (wool or synthetic gloves, hat, sweater, boots—cotton doesn't retain heat when wet) to survive most adverse conditions probable (garbage bags with holes cut for head and arms, pull up second bag for legs or poncho for wet weather)
3. Some form of emergency shelter (four seasons tent, ground cover, space or wool blanket, sleeping bag)
4. Extra food and water (Note: Water is more important.)
5. Flashlight with extra batteries and bulb
6. Fire starting material such as a candle or cotton balls covered in petroleum jelly, (35 mm plastic film containers make great storage containers for the cotton balls)
7. Waterproof matches or other means of starting a fire
8. Metal cup, can, or cooking pot for melting snow or cooking
9. First aid kit
10. Sunglasses or some type of eye protection
11. Knife, hatchet, or saw (Note: Big is not necessarily better.)
12. Tools (Leatherman®, pump pliers, basic tools)
13. Rope, parachute cord, dental floss (stronger than regular thread)
14. Map (A topographical one for your local area is best.)

For pilots, some of these basic items should be in your aircraft such as a compass, map, and flashlight. Other nice to have items include some form of tent, bivy sack, or emergency shelter, emergency signal mirror, loud whistle, plastic sheeting and tubing for collecting water, needle and thread, flexible wire saw, safety pins, cleaning wipes, solar still instructions, fishing line and hooks, wire, space blanket, some type of rope or line, more than one type or method of starting a fire, extra water in multiple bottles or canteens so if one breaks during a rough landing, you still have some water remaining, appropriate hat and coat, windbreaker, waterproof raincoat or poncho, large leaf or lawn plastic garbage bags, bug or sunscreen lotion, a metal cooking/drinking cup or container to heat food or drinks over an open fire, toilet tissue, sleeping bag in a waterproof container, insulated sleeping ground pad, ground cloth, water purifying kit, cooking and eating utensils, soap and towel, insulated waterproof sitting pad, backpack large enough to contain the items you decide to carry, cellular telephone, aircraft frequency transceiver, handheld GPS unit, lots of extra batteries, extra eyeglasses if required, large handkerchief or bandanna, canteen, any special medicines, fleece or wool sweater, appropriate fleece or wool clothing for layering, shorts, notebook and pencil, lip balm, mosquito head netting, multi-function tool, small folding wood saw, one or two hacksaw blades, duct tape, mini flares, and some basic tools that might be found in your aircraft.

Hopefully, this list of possible survival items will give you a good starting point to develop your own kit designed to protect you in your local environment. Space, weight, and cost will determine what you carry. However, regardless of what you carry, if you don't know how to safely use and carry those items, you will not gain the most protection and benefit from those items. Nothing will save you if you don't know how to survive, but people have survived on practically nothing because they knew what they were doing and their will to live overcame their environment. Have a safe winter of flying and traveling.

TEACHING (and Learning) GOOD ATTITUDES

by Al Schnur and Bill Belanger

Good communication between flight instructor and student pilot can either make flight instruction a joy or make it a chore. In particular, the instructor needs to tell or show the student not only the desired result, but also how to achieve that result using airplane attitude and power. We'll cover this in more detail shortly.

This article is intended for both flight instructors and students. We hope these two groups include all pilots because good pilots remain students throughout their flying careers. The instructor has a duty to teach in terms the student can readily understand and apply. If the student doesn't feel he or she is getting a clear explanation from the instructor, he or she should ask to have it explained another way. Our suggestions in this article are teaching techniques which we have used successfully to improve instructor/student communications. As we explored flight instructor/student communication, we found that the techniques we recommend here also provide a more detailed methodology for integrated flight instruction than we have seen before.

For this discussion, we present things in somewhat of a reverse order, flight by reference to instruments first, then flight by references outside the cockpit. The reason we call this "reverse order" follows from the path that many pilots take when they learn to fly with precision. During their initial training, they learn to fly at particular airspeeds within certain tolerances, at an altitude within tolerances, and at a heading within tolerances. Quite often the student is able to maintain the tolerances by the feel of the controls and by consulting the instruments quite frequently rather than by setting the appropriate pitch and bank attitudes and power.

Only when preparing for an instrument rating do many pilots learn about precise aircraft control by attitude and power, mainly because they have to do this in order to master instrument flight. The proper attitudes and power settings, taught from the beginning as with integrated flight instruction, greatly ease the learning process for the student and the teaching process for the instructor, in both primary and instrument instruction. Attitude flying is well covered in the *Airplane Flying Handbook* (FAA-H-8083-3 1999) and in several other texts. Integrated flight instruction is briefly covered in the *Aviation Instructor's Handbook* (FAA-H-8083-9 1999). The teaching concepts we suggest here expand on the discussion in the instructor's handbook and can provide a framework for integrated flight instruction.

The "control and performance" in-

strument interpretation is particularly relevant to integrated instruction. Under this interpretation, in instrument flight the attitude indicator and engine power gauge (tachometer or manifold pressure) are used to control the aircraft. The other instruments tell the pilot if the airplane is performing as desired. In flight with outside references, the real horizon replaces the attitude indicator. Otherwise, the function of the flight instruments is identical. This allows the instructor to teach the same aircraft control concepts for both visual and instrument flight. That old saying, "attitude + power = performance" is still the best way to fly the airplane under both IMC and VMC.

In primary instruction, it's up to the flight instructor to tell the student, "set this power and hold the horizon THERE" rather than simply giving the student a target airspeed or altitude. If the instructor doesn't do that, it's up to the student to ask, "Where should I put the horizon?"

AN IMAGINARY SPOT ON THE WINDSCREEN

With references outside the cockpit, instead of an artificial horizon in the attitude indicator, we have a real horizon (or a vague hint of one if the visibility is poor.) Unfortunately, the aircraft manufacturers have not provided a nice little dot on the windscreen like the one on the attitude indicator, so we have to invent an imaginary dot of our own. We know the dot will be on the horizon during level cruise flight, so we can imagine a line across the windscreen at that location. For any individual pilot, the location of this line will be level with the pilot's eyes, so seat height is important.

We must now find the place on this line that is directly in front of the pilot. This is the reference, which allows us to set the aircraft attitude in both pitch and bank. We need to pick a reference directly in front of the pilot that is in line with where the aircraft is pointing. A common error with beginning pilots is to think that reference point should point toward the propeller spinner. This works only in airplanes which are only one seat wide. On side-by-side airplanes it will be off to the side, about as far from the airplane's center as the middle of the pilot's seat. The easiest way to find this line is to observe where the airplane is going as you taxi straight along the taxiway centerline. Pick a point at the end of the taxiway and note where it falls on the top of the panel. A piece of tape on the top of the panel can mark this spot. (Renters should use removable tape.) The imaginary spot on the windscreen will be on the imaginary horizon line directly above the tape. Memorize this spot.

The tape on the panel can also be quite useful for landing, since many airplanes give the pilot little cue which way they are pointing, resulting in a tendency to land in a slight crab. On landing, if the tape is held at the direction toward the far end of the runway, the airplane will land aligned with the runway.

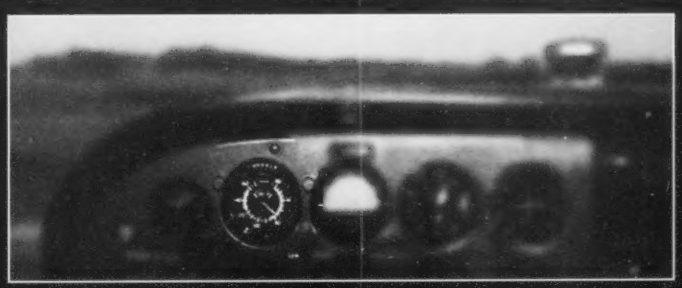
CLIMBS

To enter a climb from level flight, during flight by reference to instruments, the usual procedure is to pitch up to the proper attitude, allow the airspeed to decrease and then add power. The power setting is full power or whatever is recommended by the manufacturer for climbs. After establishing the approximate climb attitude, the pilot waits for the airspeed to stabilize. He or she then briefly checks the airspeed indicator. The airspeed indicator is used as a "performance" instrument. If the airspeed is not at the desired speed, the pilot makes minor pitch changes to achieve V_y or some higher en route climb airspeed. Now it's time to trim off the control pressures. For a typical light single, a good first cut at the climb pitch attitude for V_y will be about 10 degrees nose up. For those older aircraft whose attitude indicators do not have degree markings on the face of the instrument, that is three bar-widths. This usually results in a climb at or very close to V_y.

Since the airplane doesn't know whether its in IMC or VMC, the same pitch attitude works when flying by outside references. The attitude will be the same as the one we just found in the paragraph above using the attitude indicator. Be sure to set the attitude indicator so the bar is centered in level flight first. After a stable climb at V_y is achieved, take a look out at the wing tips and the relative position of the horizon below the imaginary point on the windshield. That becomes the VFR attitude for climbing at best rate (V_Y). With any luck, the horizon will still be visible in front of the airplane at this pitch angle. If it is not, you should be aware that, in addition to not seeing the horizon, you also cannot see other airplanes at your altitude. A change in seat height may be in order if it is practical. If necessary, the climb pitch attitude can be set by looking at the angle of the wing tips with respect to the horizon or by setting the horizon at a point along the side of the panel, but this is not as good as keeping it (and the traffic) in sight.

Climbs are often the first maneuver

Figure 1



Student's view of climbing at an airspeed

Figure 3

Student's view of a climb with the horizon as a reference

done by a student. Now consider how an instructor might tell a student to make the airplane climb. Since most primary training airplanes use full throttle for climb, the instructor will tell the student to hold the throttle all the way forward during the climb. This is not confusing and most students can do it quite well. The problem comes when the instructor tells the student to "climb at V_y," or at an airspeed that the instructor knows to be V_y. Figure 1 shows what the student is looking at under this guidance. His or her eyes are fixed on the airspeed indicator. What typically happens is pilot induced oscillations while the student bravely tries to follow the airspeed needle. Fortunately, the instructor is along as a safety pilot to look out for traffic.

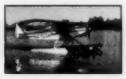
A better thing to say might be to "climb at ten degrees nose up" or some other pitch attitude the instructor knows will result in V_y. That pitch attitude is given in degrees. If the student looks around the panel, he or she will see that the attitude indicator has pitch marked in degrees, and so will pay attention to that instrument. Figure 2 shows what the student sees when trying to follow this guidance from the instructor. The student's head is still buried inside the cockpit, but at least the climb is stable.

If the instructor puts the airplane in a V_y climb configuration and tells the student to "hold the horizon there," the airplane will climb at the proper speed. This results in a stable climb and the student's eyes will be outside the cockpit where they belong. Figure 3 is what the student should see when the instructor uses this wording to tell the student how to climb. The instructor can relax a little (but not much.)

How about climbing at the best angle (V_x)? A first cut at this pitch attitude is similar to the attitude for V_y or maybe a little higher. For airplanes that use flaps for best angle, the pitch angle of V_x may be the same as or very close to that for V_y. This works

Figure 2

Student's view of climbing at ten degrees nose up



out to be about three or four bar-widths on the older attitude indicators. This first cut pitch angle can then be fine-tuned to achieve V_X. Note that it's better to have a first cut at the pitch angle that gives an airspeed slightly above rather than below V_X, so ten degrees is a safe first cut in most light singles.

To find this pitch angle as a horizon reference, establish a stable V_X climb using the appropriate flap setting and look out the window. Notice the position of the horizon below the imaginary spot. Hold the horizon in this location, trim, and viola, you will be climbing at V_X. The power, of course, is per the manufacturer's recommendation. For a short field takeoff the flaps are set in advance, so all that is necessary at rotation speed is to bring the nose up to this attitude and hold it there until a stable climb is established, then briefly check the airspeed.

It's worth noting here that V_X and V_Y both change slightly with density altitude and aircraft weight, and V_X is affected by wind. This is covered in some advanced flight manuals but is too detailed to present here. Most primary students use the settings for gross weight and are typically not taught about the changes in V_X and V_Y with density altitude. So to teach a short field takeoff the instructor should tell the student (among other things) when to rotate, where to hold the horizon after rotation, and to check for V_X after a stable climb is established. The student's eyes should not be on the airspeed indicator when trying to clear an obstacle.

TURNS

To make a level turn on instruments, the turn is entered using the attitude indicator as the control instrument. The pitch attitude is held the same as for level flight as the turn is entered. This requires a little back pressure as the airplane banks. Using the attitude indicator, the little dot at the center is kept on the "artificial horizon" line. A first cut of about 15 degrees of bank gives a standard rate turn in a typical light single, with greater bank required for faster airplanes. The exact bank required is a function of airspeed. Then the pilot adjusts the bank as needed to produce the desired rate of turn. The key to a level turn is to hold the dot on the horizon line.

We have already established an imaginary mark on the windscreen directly in front of the pilot's eyes. By rolling the airplane so the horizon stays on this spot, a level turn will result. The airplane will not climb or dive. This is exactly the same as rolling the airplane into a turn and using the attitude indicator keeping the dot on the artificial horizon. Be aware that the location of the imaginary spot on the windscreen will change if you change your seat height. You have to adjust the spot height the same as you need to adjust the horizon line on the attitude indicator, though the reason for needing the adjustment is different.

If the student is told by the instructor to make a turn with no loss or gain

Figure 4

Student's view of rotating the horizon about a point on the windshield

in altitude, he or she will look at the altimeter during the turn. There will usually be many changes in bank and pitch attitude as the student chases the altimeter needle. The instructor should be prepared to act as safety pilot during this maneuver.

A student should be taught turns by rolling the horizon about this imaginary point on the windscreen. The instructor should first demonstrate a turn and tell the student to rotate the horizon about the imaginary mark and then to hold the horizon THERE while in the turn. If this is done the student will establish the proper bank and pitch attitude for the level turn and may even watch for traffic during the turn. An occasional glance at the altimeter and vertical speed indicator as performance instruments will verify that the turn is level. Figure 4 shows the student's view of a left and a right turn superimposed on level flight attitude. This shows the rotation of the horizon about the imaginary point.

SLOW FLIGHT AND STALLS

As surprising as it may seem, the pitch attitude for V_y is also very close to the power-off stall attitude (flaps up, not climbing or descending) of many light singles. This depends mainly on the shape of the airfoil. A similar attitude, with a little power added, yields flight at minimum controllable airspeed. Since you already know where the horizon belongs for climb, you also have an approximate idea of the stall attitude in level flight. A descent changes the relative wind across the wing and a stall will happen at a lower pitch attitude, so the stall attitude is flatter. Use of flaps makes it flatter still. Stall attitude in a steep descent with full flaps can be close to or even below level.

This can serve as a warning attitude. If the nose is as high as needed for V_y and the airplane is not developing climb power, a stall will probably happen sometime soon. The nice thing about this is it gives you a warning long before the stall warning horn sounds. It's not exact, but it warns you of impending trouble. In a descent with full flaps, a slight nose down attitude needs to be maintained. A level attitude with decreasing airspeed and decreasing control "stiffness" is a warning of an impending stall long before the stall horn sounds.

If the instructor shows the student the stall attitude and the feel of the airplane as stall is approached the student will be able to recover from incipient stalls, and will probably never reach this point unintentionally. If the instructor tells the student only about the stall airspeed, the student will tend to look at the airspeed indicator when he or she is approaching a stall. This is the last place a pilot should look when a stall is about to happen.

LANDINGS

The stall attitude for level flight is close to the landing attitude, though use of flaps will result in a stall at a somewhat lower pitch attitude. To make a good landing at minimum speed, the airplane is held a foot or so off the runway by gradually raising the nose until the stall attitude is reached. Maintaining this pitch attitude will require different elevator pressures than power-off stalls at altitude due to ground effect, and the stall will occur at a lower airspeed. Ground effect also makes the airplane feel nose heavy due to the increased lift experienced by the horizontal stabilizer. When the airplane stalls, it will drop gently onto the runway at minimum speed, and will not tend to become airborne again.

Being able to accomplish this depends on your knowing exactly how high the wheels are above the runway. Unfortunately, we are not always blessed with this information. Unusually wide runways give the illusion of being lower than you are while narrow runways give the illusion you're higher. If you fly many different aircraft, the differences in pilot position can easily be more than that foot of altitude you're supposed to maintain while the speed bleeds off. At night, your exact height above the runway is anybody's guess.

This requires another landing technique, somewhat like the "glassy water landing" used in seaplanes. This technique can be used when there's any doubt about your exact height above the runway. The general idea is to fly low over the runway with power off or very low. Bring the nose up as the airspeed bleeds off. As soon you approach the landing attitude, lower the airplane onto the runway by holding the pitch attitude constant. The airplane will descend as it slows for a silky smooth touchdown.

The instructor should teach landing attitude, not landing airspeed. Approach airspeed is also important, and must be carefully controlled, usually by the use of power rather than pitch. After the round out, the pitch attitude is most important to teach. Nobody should be watching the airspeed indicator while landing an airplane.

SOFT FIELD TAKEOFF

Normal and short field takeoffs do not require pitch control during the ground roll unless you're flying an airplane with "conventional" landing gear. With a tricycle gear airplane, all three wheels are on the runway, and the pitch attitude is set by the landing gear. Only the soft field takeoff requires the pilot to establish a pitch attitude during the ground roll. The reverse is true for a taildragger, but here we'll talk only about tricycle gear airplanes.

The proper pitch attitude to hold during the ground run has not previously been defined to our knowledge. The following is a technique we have found to work in practice in many airplane types. Here's how it works. Consider that the stall angle of attack also happens to be at the maximum coefficient of lift for the airfoil. This means that for any given airspeed, this angle provides the most lift. And since maximum lift is what we want in order to get the weight off the mains on soft ground, this is somewhere near the appropriate nose-up angle for the ground run in a soft field takeoff. A pitch attitude with the nose any higher than this only adds a lot of drag and actually reduces the lift. Now let's decide on an exact pitch attitude.

To derive the best pitch attitude during the ground run, we can first bracket the range of possible attitudes. We already know the landing attitude, and we know it is also the power off stall attitude with full flaps. We previously found flaps up stall attitude, which is close to the climb attitude. With an intermediate flap setting typically used for soft field takeoff, the actual stall attitude will be somewhere in between. This sets a range of attitudes we can explore.

The flaps up stall attitude may be a little too high because it will be somewhat higher than the stall attitude with partial flaps. It will produce more drag and less lift, so a flatter pitch attitude is needed. In practice, the landing attitude is a good choice because it keeps the airfoil in its operating range, slightly below stall attitude with partial flaps. It's a little shallower than the actual power off stall attitude with partial flaps, but will keep the nose wheel off the ground and will not allow a stall to develop when the airplane leaves the ground under full power.

For a soft field takeoff, hold the landing pitch attitude during the ground run. Again, ground effect will make the airplane appear nose heavy and require varying rudder pressures as the airplane accelerates. Be prepared for the airplane to want to pitch up as the weight comes off the mains in a tricycle gear airplane. Leaving ground effect will also make the airplane want to pitch up, and this must be avoided by relaxing the back pressure as necessary. The important thing is to hold the pitch attitude constant using whatever control pressures are needed.

The next logical question is what pitch attitude to hold after the airplane breaks ground. We can bracket this attitude with two simple observations:

1. Don't hit the ground with the nose wheel, and
2. Don't stall the airplane.

The latter objective is usually achieved by climbing out at an airspeed above V_X.

Before this writing, the pitch attitude for the ground roll was not specified and could be quite high. The technique therefore included a slight lowering of the nose after the airplane breaks ground. The big question was how far to lower the nose. This depends on how high it was held during the ground run. The airplane would then be flown close to the ground until V_X was reached and then the climb reestablished. In order to do this, you would have to be looking at the airspeed indicator while flying less than ten feet above the ground. We don't see this as a terribly good thing to do, and even harder to teach a student to do. This has made many students avoid soft field takeoffs.

We have found the following technique works well. In most airplanes the pitch angle for the ground run (the full flaps landing attitude) is somewhat shallower than the pitch angle for V_X, and so will allow the airplane to accelerate to V_X before it climbs out of ground effect. In other words, it's not really necessary to lower the nose. All that is needed is to hold the landing pitch attitude during both the ground roll and the initial climb. This has resulted in a safe soft field takeoff in all the airplanes in our experience. It also does not require attention to the airspeed indicator when flying close to the ground, so we feel it is safer. Just remember, the airplane will try to pitch up when it breaks ground and also when it leaves ground effect, so some relaxation of the up elevator pressure (or even forward pressure) will be needed to hold the horizon in the right place.

Again, the instructor needs to teach the proper position of the horizon during the takeoff run and climb out. The student should be looking out at the world, not staring at the airspeed indicator during this critical phase of flight. We have found this technique to be easier to teach, generally safer, and our students lose their fear of soft field takeoffs.

LEVEL FLIGHT

Surprisingly, one of the more difficult flight attitudes to maintain is that of level flight. The reason being that the pilot must continuously correct for small dives, climbs, and banks. It actually is rather labor intensive. However, the trick is to know where the nose and the wing tips of the airplane belong with respect to the horizon. Again, we can make use of that imaginary spot on the windshield. By holding the horizon there, the airplane will not climb or dive. The pilot need only correct for the minor influences of rising and falling air currents. With a little practice it becomes second nature. Not banking the airplane results in not turning the airplane, a double negative we know, but that's how it works. As with instrument flight, if you don't want to turn, hold the wings level and use the rudder to make minor corrections.

If the instructor tells the student to maintain a particular altitude and heading in level flight, the student will look at the altimeter and heading indicator. If the instructor tells the student to hold the horizon THERE and make occasional altimeter checks, things will be a lot smoother and safer. A visual reference can also be selected for heading control. A good rule is to tell the student to check the altimeter about as often as he or she checks the speedometer while driving a car.

THE ONLY WAY TO GLIDE

When confronted with a power failure, real or simulated, the airplane should be flown to give the pilot the best chance of reaching an emergency landing area. This usually means flying at best glide speed, which gives the maximum glide range and puts as many landing spots as possible within reach. In most general aviation airplanes, best glide speed means flying the airplane close to the same pitch attitude as is used for level flight. Note that the FAA's *Airplane Flying Handbook* tells you to establish "best glide attitude." It does not suggest staring at the airspeed indicator when the engine quits.

So if the engine quits, there is no immediate need to make any change to the pitch attitude to get best glide speed. Just hold the horizon on that imaginary spot and don't let the nose drop. As the glide speed is ap-

proached the best glide speed can be maintained by trimming the airplane close to this same level flight pitch attitude. This level attitude or one close to it will result in the best glide speed for the airplane for the weight configuration. Note that the best glide speed changes with aircraft weight, but the proper pitch attitude does not.

Since we know how to get to best glide speed using pitch attitude, there's no need to waste time staring at the airspeed indicator. Spend the time looking for a place to land. If you hold level pitch attitude as you look for a place to land and turn toward it, you will be close to best glide speed as you complete the turn toward the field. No need to even glance down at the airspeed indicator until you're headed toward a landing spot, then make small pitch adjustments as needed. Now's the time to try a restart if there's sufficient altitude (usually more than about a thousand feet.) The important thing is to maintain that best glide pitch attitude until you're over the landing site and prepared to descend to a landing.

If you wish to descend at minimum sink rate, which occurs at approximately 3/4 of the glide speed, merely raise the nose about three degrees (one bar width on the attitude indicator.) This speed will be useful prior to touch down because it gives the lowest forward and vertical speed.

The instructor should stress pitch as the way to control the airplane immediately after an engine failure. The airspeed indicator is only a performance instrument. It tells you if you selected the right pitch attitude. The student should not be told to establish best glide airspeed immediately after an engine failure—he or she will only fixate on the airspeed indicator and forget about everything else.

The most important thing to stress is that flying the airplane takes priority over everything else in an engine out emergency. Finding and reaching a landing spot should be done before spending a lot of effort getting the glide airspeed exactly right. Attitude control for best glide speed is all that's needed until the airplane is headed toward a landing spot.

IN CLOSING

The visual flight techniques we have described are identical to the control and performance concept for instrument flight. That concept was originally developed to make instrument flight more like flight with visual references, but works just as well the other way around. Integrated flight instruction has often been discussed, but the techniques for this instruction have never been well described. In this article, we've suggested how to use the "control and performance" instrument interpretation in primary flight instruction. In the process, we've added takeoff and landings to the "control and performance" concept.

You can fly an airplane with precision using visual references by simply choosing an imaginary point on the windshield and substituting the horizon for the attitude indicator. Instructors can better communicate with their students by taking advantage of this "VFR attitude indicator" and teaching students to use it. The only equipment needed to do this is a short piece of tape to mark the top of the panel, costing maybe two cents. It's called "how to improve your pilot skills for about two cents," though somebody will undoubtedly invent a device to do the same thing for several hundred dollars. But hey, this is aviation!

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The recommendations contained in this article are the views of the authors and not FAA's.

FAMOUS FLIGHTS

Mail: The History of Its Taking Flight

by Karin Thiessen

The mail is a daily part of people's lives, yet few people consider what happens to their letters while they are in transit to their destinations. Even fewer realize the long history behind the mail service, especially airmail which reaches back into ancient times. The Chinese used kites to relay messages through prearranged signals. The Greeks and Romans used pigeons to carry important messages. Carrier pigeons are still used by some people today.

The invention of the hot air balloon by the Montgolfier brothers in 1783 presented a new vehicle that could carry both men and mail into the skies. On November 21, 1783, the first manned balloon lifted into the skies from a site in Paris where it drifted several miles before coming down. In November 1784, Dr. John Jeffries of Boston and French aeronaut Jean Pierre Blanchard rose above London in a balloon from which Jeffries dropped messages to his friends. In early 1785, Jeffries and Blanchard again ascended in a balloon, although this time they crossed the English Channel. On this trip they carried pamphlets with them.

In 1793, one of the first balloon ascents occurred in the United States with dignitaries such as George and Martha Washington, Alexander Hamilton, and John Jay in attendance. It occurred in Philadelphia when aeronaut Blanchard, with a handwritten letter by George Washington as his passport, lifted on his historic journey. The letter he carried with him is considered to be the first airmail letter in America.

On December 17, 1903, two brothers from Ohio quietly ushered in a new era in aviation. Wilbur and Orville Wright made the first controlled flight of a heavier than air machine. This historic achievement changed the face of transportation, although it would be several years before the importance of this first flight would be realized. In the years immediately following the Kitty Hawk flight, aviation developed in leaps and spurts in both the United States and Europe. Not only the Wright brothers, but also men such as Glenn Curtiss, Louis Bleriot, the Voisin brothers, as well as many others continued to improve on the aeroplane.

Airmail soon felt the impact of early aviation. The year 1911 saw several occasions of mail being flown by plane. One of the most famous instances occurred at Garden City, New York, where an international aviation meet was taking place. With the sanction of the Post Office Department, airmail was flown on a daily schedule during the gathering. The pilot, Earle L. Ovington, was sworn in as a mail carrier and flew the mail in his Bleriot airplane the short distance from Hempstead to Mineola, New York. The years between 1911 and 1916 were a period of experimentation with the airmail. Experimental flights at fairs, carnivals, and air meets were authorized. These years allowed interest in the concept to develop in the minds of the people. They also allowed the Post Office to experiment with little expense on their part.

America's entry into World War I brought about several new developments in the field of aviation. The need for pilots with experience in cross-country flying soon became apparent to the military. At the same time, Congress appropriated $100,000 dollars for the fiscal year ending June 30, 1918, for establishing an experimental airmail route. The airmail service became a joint venture between the War Department and the Post Office Department. Leading figures in this venture were Secretary of War Newton Baker, Postmaster General Albert S. Burleson, Second Assistant Postmaster Otto Praeger, Major Reuban Fleet, and Captain Benjamin Lipsner.

On May 15, 1918, the world's first regularly scheduled airmail service was inaugurated. The mail was carried from the Polo Grounds in Washington, DC, to New York City—Belmont Park on Long Island to be exact—with an intermediate stop in Philadelphia. It was a 218 mile trip. The four pilots, selected for service were Lt. George Boyle, Lt. Paul Culver, Lt. Torrey Webb, and Lt. James Edgerton. Witnesses to this historic event included

several important dignitaries and President and Mrs. Wilson. The inaugural flight had an inauspicious beginning as the plane from Washington was delayed in starting because the gas tank was dry. Then Lt. Boyle, while following the railroad, took the wrong direction and flew south. He ended up in Waldorf, Maryland, with a damaged plane. All the other pilots, however, made it to their destinations. For the next three months, the Signal Corps of the Army would fly the mail using Army airplanes. Their last flight occurred on August 10, 1918. The following Monday, August 12, 1918, the first all civilian U.S. Air Mail Service took off from College Park Airport, Maryland.

With the large number of surplus military aircraft and former military pilots, the Post Office had no problems getting men and machinery to take over the job. Max Miller was the pilot for this historic first. Mrs. Benjamin Lipsner, whose husband was now superintendent of the airmail, signaled the start by handing Miller a small silk American flag. Other pilots who flew on the inaugural day included Maurice Newton, Robert Shank, and Edward Gardner. By 1918, fifteen years had elapsed since the Wright brothers conquered flight at Kitty Hawk, yet airplane technology had advanced considerably, especially as a result of the impact of World War I. The Postal Department had several types of planes, each with its own problems and strengths. These included the Curtiss JN-4H or "*Jenny*," the Standard, and the De Havilland DH-4B.

Soon after the inaugural flight at College Park plans began for the expansion of the airmail service. The proposed new route would be from New York to Chicago with several intermediate stops included for refueling. These stops included Lock Haven, Pennsylvania; Cleveland, Ohio; and Bryan, Ohio. Pilots Max Miller and Edward Gardner with Eddie Radel as mechanic took off on September 5, 1918 for Chicago. Miller and Gardner encountered several mishaps along the route. Miller flew through low clouds which obscured his view of the ground, a circumstance which was especially precarious as he had to fly over mountains to reach Lock Haven. Throughout Miller's flight the radiator also gave him trouble. The estimated flight time for this route was eleven hours westward and ten eastward. Miller flew the westward flight in thirty-seven hours. This flight while containing many dangers and delays opened the Woodrow Wilson Airway.

The men who flew the airmail were courageous individuals who risked their lives flying in all types of weather and in planes that didn't always work. These early planes did not contain any radio navigational aids and many times the compasses were not reliable. Yet in spite of these problems, the Post Office demanded that the mail get through. Edward Gardner was one of several aviators who were fired for not flying due to poor conditions.

College Park Airport acted as an airmail depot from 1918 to 1921. These years proved the viability of airmail and allowed experimentation and expansion. Douglas Fairbanks, Sr., came to the airport in 1918 as part of the Liberty Loan Drive. He was flown from College Park to New York as airmail to raise money for war bonds. During this time, it was discovered that longer distance flights were more cost efficient than short range flights, so in 1921 College Park station was closed. The Post Office would concentrate on transcontinental air routes from New York to San Francisco and a series of rotating beacons would be deployed across the country to make night flight possible. Radio navigational aids were still in the future.

The airmail continued to expand after it left College Park in 1921. The airmail and the pilots continued to reach new goals. Overcoming problems with engines, poor gauges and instruments, and the weather, the Airmail Service continued to advance as longer routes pushed men and planes into new conditions and goals. Airmail eventually became transcontinental: By 1927, airmail routes were contracted out to private companies. Commercial aviation got its wings through the pioneering spirit of the airmail and its pilots. However, it was not without its scandals.

In 1930 the Post Office contracted with three large airlines to fly the three transcontinental mail routes. This action was thought to make the transport of mail cross-country more efficient. What it did was cause a scandal of major proportions. Smaller airlines began complaining that the Postmaster General's action was unfairly denying them the chance to bid on the contracts. By 1934 the scandal prompted President Franklin Roosevelt to cancel all air mail contracts. For the next five months the U.S. Army was again delivering the mail. However, the number of accidents caused by weather and Army pilots not familiar with the air mail routes convinced FDR to reverse his decision and, by means of the Air Mail Act of 1934, air mail contracts were again bid out to the private sector under a new set of rules that made the bidding process more competitive. A new chapter in aviation history began as the larger airlines now paid more attention to the passenger side of aviation.

When asked about those early days of scheduled airmail service, former airmail pilot and head of the Civil Aeronautics Administration, Charles Stanton, said, "We planted four seeds....They were airways, communications, navigation aids, and multi-engined aircraft. Not all of these came full blown into the transportation scene; in fact, the last one withered and died and had to be planted over again nearly a decade later. But they are the cornerstones on which our present world-wide transport structure is built, and they came, one by one, out of our experience in daily, uninterrupted flying of the mail."

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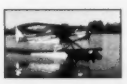

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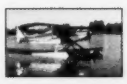


What can an airport operator do to control access to the airfield?

Limit access to those persons who need to be on the airfield. Methods for controlling access to the airfield will vary depending on the type and location of the airfield. The following methods have been used individually and in combination with one another to control airfield access:

- Fences
- Gates with electronic or mechanical locks or gate keepers
- Warning signs
- Natural or manmade barriers, such as streams, embankments, and ditches
- Vehicle identification systems
- Frequent inspections
- Tenant awareness

What can an airport operator do to improve the safety of vehicle operations on the airfield?

Overall responsibility for airport vehicle operations rests with airport management. It is important that management establishes written rules or regulations for the safe and orderly operation of vehicles on the airfield. The rules or regulations should address the following:

- Vehicle operator requirements
- Vehicle requirements
- Vehicle operations
- Enforcement/sanctions

For additional information, contact the regional runway safety program manager or airports division.

Alaska
RSPM: 907/271-5293
Airports Division: 907/271-5438

Central
RSPM: 816/329-3044
Airports Division: 816/329-2600

Eastern
RSPM: 718/553-3326
Airports Division: 718/553-3331

Great Lakes
RSPM: 847/294-7853
Airports Division: 847/294-7272

New England
RSPM: 781/238-7027
Airports Division: 781/238-7600

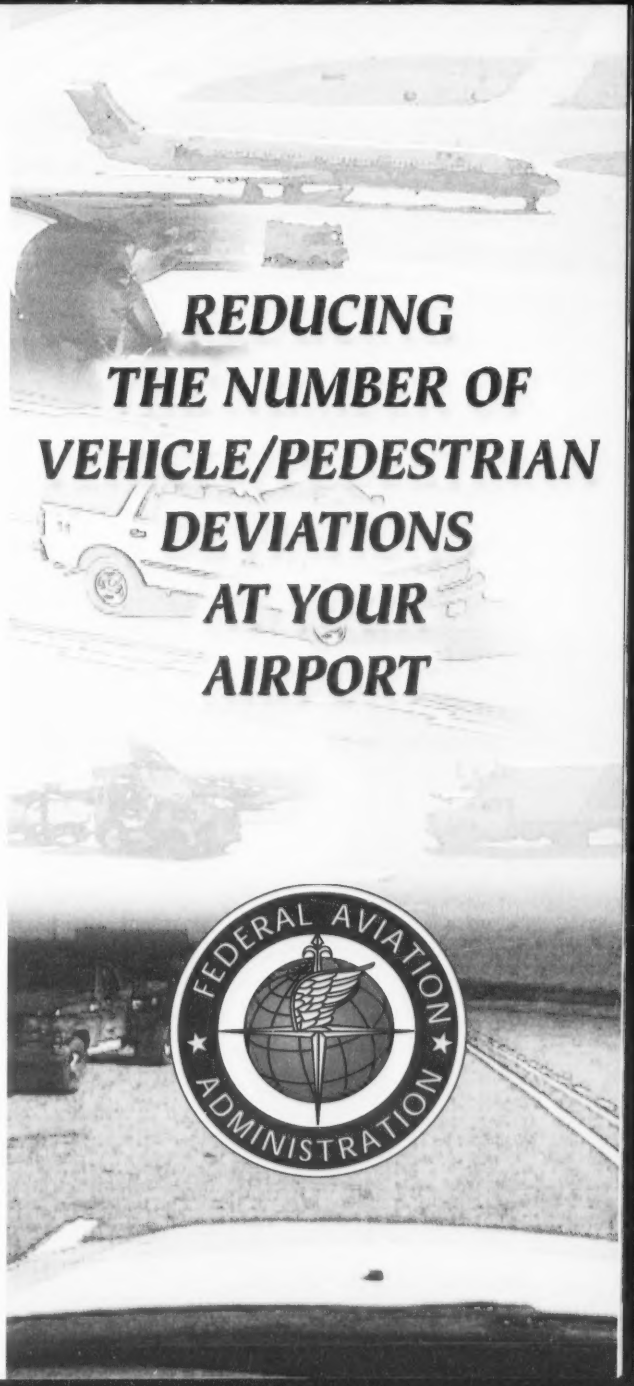
Northwest Mountain
RSPM: 425/227-1369
Airports Division: 425/227-2600

Southern
RSPM: 404/305-5558
Airports Division: 404/305-6700

Southwest
RSPM: 817/222-5045
Airports Division: 817/222-5600

Western Pacific
RSPM: 310/725-3550
Airports Division: 310/725-3600

Federal Aviation Administration
Office of Runway Safety
(202) 267-9131
Office of Airport Safety & Standards
(202) 267-3053
www.faa.gov/runwaysafety/



Vehicle/Pedestrian Deviations

In 2000, the FAA received reports of more than 550 vehicle/pedestrian deviations (V/PDs)—of which 85 resulted in runway incursions. Investigation of these events found that many of them involved persons who did not belong on the airfield. Although some of these people deliberately entered the airfield, many entered it inadvertently.

What is a V/PD?

A V/PD is any entry or movement on the movement area by a vehicle (including aircraft operated by non-pilots) or pedestrian that has not been authorized by air traffic control.

Why are V/PDs a concern?

- Sometimes the vehicle or pedestrian conflicts with an aircraft landing or takeoff, resulting in a runway incursion.
- Even if the vehicle or pedestrian does not enter a runway, the deviation can divert the controller's attention from aircraft and other vehicles, which could result in an incident or accident.

Vehicle Operator Requirements

A key to reducing V/PDs is making sure that those who are authorized to drive on the airfield possess the knowledge to do so safely. The knowledge required will vary depending on the airport and where the person is authorized to drive on the airfield. For example, a person authorized to drive on runways needs to be knowledgeable about procedures for radio communications; in contrast, a person authorized to drive only on ramps would normally not require this knowledge. Vehicle operators need to know, as appropriate,

- Airport rules and regulations pertaining to vehicle operations
- Areas where they are authorized to drive and designated entrance and exit points to these areas
- Location of perimeter roads
- Boundaries of the movement versus nonmovement areas on the airfield
- Airport layout, including designations of runways and taxiways
- Meaning of airfield signs, marking, and lighting
- Proper phraseology, including phonetic alphabet, procedures, and frequencies for radio communication
- Meaning of light gun signals
- Traffic patterns associated with each runway and location of each leg (i.e., downwind, base, final, and crosswind)

Driver Training

Airport operators have the responsibility of ensuring persons possess adequate knowledge of the above items before authorizing them to drive on the airfield. It is highly recommended that those who drive on the airfield be provided initial and recurrent training on these subjects. The importance of such training on a regular basis cannot be overemphasized.

Vehicle Requirements

Requirements for vehicles will vary depending on the airport, the type of vehicle, and where it will be operated on the airport. Generally, a vehicle operating on runways and taxiways should, as a minimum, have

- Marking designating the identification of the vehicle (e.g., OPS-1)
- Minimum equipment, which must be in proper working order, such as
  - headlights, taillights, mirrors, a speedometer, etc.
  - a rotating beacon
  - a two-way radio with the aviation frequencies
- Insurance coverage

Vehicle Operations

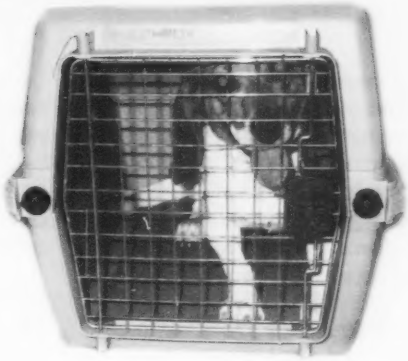
The airport-established rules or regulations should provide adequate procedures for the safe and orderly operation of vehicles on the airport. Items to consider include

- Requirements for vehicles on the movement area to be radio-equipped or escorted by a radio-equipped vehicle
- Speed limits
- Prohibition against careless and reckless operation
- Time periods when vehicle lights must be operated
- Requirement to use vehicle lanes and perimeter roads
- Locations where vehicles may or may not be parked and/or serviced
- Rules of right-of-way (i.e., aircraft, emergency vehicles, and other vehicles)
- Requirements to report accidents involving ground vehicles

Enforcement/Sanctions

Establish procedures for enforcing the airport-established rules or regulations, including penalties for violations. Effective penalties include monetary fines and revocation or suspension of airport driving privileges.

Traveling With Your Pet



by Phyllis Anne Duncan

This article was written pre-9/11/01, so it was put aside until thing got back to "normal." Now that the holiday season is upon us again, people are thinking of family gatherings, and of course, the pet is part of the family.

Okay, so this is not your typical aviation safety issue, but it's a topic which has engendered a great deal of interest periodically. Everyone recalls the incident where an airline captain diverted to land his aircraft because he had received company information that a passenger's personal pet had been placed in the wrong (unheated) cargo compartment. The dog-loving captain then allowed the shivering, but otherwise unharmed, dog to stay with his master in the aircraft's cabin. And there are the horror stories which did not have happy endings—pets who died in transit because of mishandling. These incidents garnered so much attention that the U.S. Congress has debated passing legislation concerning the safety of pets aboard airline flights. (I'm not saying a word!)

Actually, there is no FAA regulation which applies. The individual airlines decide how they are going to handle pets, and that's basically they're either carry-on baggage (if small enough and in an appropriate pet carrier) or cargo carried in the hold. As a frequent traveler, I've seen the number of people traveling with family pets increase over the past few years, including one trip where I had to call a gate agent's attention to a large, moving shoulder bag carried by a woman on her way to Florida. The shoulder bag held her cat, whom she'd sedated before leaving home, but because the flight was delayed, the sedation was wearing off. That was one upset cat, so you can imagine what could have happened if it had gotten loose inside the cabin after takeoff. After the gate agent secured a loaner pet carrier that fit under the seat and the indignant woman proceeded to her seat assignment, he and I looked at each other a moment and voiced the question simultaneously, "How did THIS get past the security screening?" Turns out the cat was still asleep then and, so, apparently was the screener for not noticing.

An airline pilot friend of mine recounts an incident where a passenger in the first class section of a 747 refused the flight attendant's instructions to put her miniature poodle back in the pet carrier. (This airline, as with most, has the requirement that pets remain in the carrier at all times.) After repeated entreaties, a call was placed to the cockpit, and, since my friend was a brand new flight engineer, she got the duty to go back and discuss the issue with the passenger. This seemed to be going no where as well, with my friend insisting, the passenger refusing, and the little dog generally making a nuisance of itself in the first class cabin. Finally, my friend, who is a former L.A. County Deputy Sheriff as well, picked up the pooch, pointed to the catering elevator, and banked on the passenger not knowing what it was for.

"That," she told the passenger, "is the trash chute which leads to the outside of the aircraft. Either the dog goes in the carrier or down the chute. You decide."

"You can't do that!" the passenger insisted, at which point the other passengers chimed in and alleged that she could.

The passenger replaced the dog in the carrier, took my friend's name, which she happily gave, and threatened to write a letter to the airline. Apparently, she never did because nothing more was heard about the incident.

Much like "air rage" this was a potential safety problem, not to mention a huge potential liability for the airline if an animal loose in the cabin forces the cockpit crew to become distracted during a critical phase of flight or if the animal bites a crewmember or another passenger. Even the soft-hearted airline captain who diverted to save a dog's life might not have been hailed a hero, as he was, had something occurred during the diversion and caused an accident.

Another aspect of traveling with your pet, particularly overseas, can be health department restrictions. Some countries require significant periods of quarantine before releasing a pet, so accompanying you for a two-week vacation to England, say, might require a six-month quarantine. And this is a situation where ignorance of local regulations won't fly: The pet will be confiscated and quarantined. There have also been incidents where quarantined pets were mistakenly euthanized.

So, if the FAA has no regulations or suggestions on how to travel hassle-free with a pet, who does?

Would you believe, the U.S. Department of Agriculture? Specifically, the Animal and Plant Health Inspection Service (APHIS), which enforces the Animal Welfare Act (AWA). APHIS

sets the regulations for shipping animals, and their concern is that shippers and handlers deal with these animals humanely. APHIS has prepared some tips to assist people who wish to travel with their pets, and we'll summarize them here then tell you where you can obtain further information.

Getting Ready for Air Transportation

APHIS suggests you have a vet examine your pet before an airline trip to ensure that its health is good enough for the flight. Some airlines and state health officials may actually require a health certificate from a veterinarian before allowing the animal to be shipped by air. The vet's examination and issuance of such a certificate should occur within 10 days before the trip.

If your pet is due to have any vaccinations or boosters or other treatments, get them done before the trip. Tranquilizers should only be used if a vet prescribes them and use only the prescribed dosage.

It will be a good idea, then, to check with the airline you plan to use well before your trip to see what requirements they have for shipping pets by air. Some require you to bring your own carrier, but some will only allow you to use one that they provide.

Trips Outside the U.S.

As mentioned above, overseas destinations may have quarantine requirements for even domesticated pets, but don't assume that because you're going to a U.S. destination that quarantine may not apply. Because its agricultural products are very sensitive to any type of parasite, Hawaii has some very restrictive quarantine and health requirements for pets. Your State Veterinarian's office should be able to assist in spelling out these requirements for Hawaii. For foreign countries, you should contact either their embassy or a local consulate for their regulations and requirements and at least four weeks in advance of your trip.

Again, checking with the airline concerning an international flight and your pet is a good idea. There might be some additional requirements for an international trip, such as additional ventilation, labeling, and a shipper's certification.

Some Travel Isn't for the Birds

Some birds, particularly U.S.-origin birds, are exempted from USDA or foreign quarantine requirements for imported birds. The emphasis is "U.S.-origin." Unless your bird comes with papers much like an AKC dog, it might be impossible to know if your bird is imported or U.S. origin. To be safe you should contact the USDA and the U.S. Fish and Wildlife Service for the appropriate requirements. That way, you may not be a candidate for violating the Convention on International Trade in Endangered Species. The health certificate required for some birds can't be from any veterinarian but from a USDA-APHIS veterinarian, and a user fee is charged for this.

Airline Procedures

No airline can guarantee it will accept an animal its personnel has not seen. This is why it's important to obtain the airline requirements well before you show up for the flight. An airline may refuse to accept an animal if it appears to be in bad health, if its carrier is not marked appropriately, or if the kennel is not the proper size. This is a liability issue for them. If your pet dies because you crammed it into a kennel too small for it, the airline doesn't want to be held responsible for your bad planning. If a pet becomes frightened or enraged by its confinement or because of its poor health and injures an airline employee, again, the airline wants to put the responsibility in the proper place. USDA allows airlines to have the final say on whether or not it will accept an animal for shipment.

When an airline transports animals in the cargo hold, the pilots are advised and detailed manifests are kept—which is how the captain mentioned earlier learned of the incorrect loading of the dog in an unheated compartment. Some airlines will allow you to "check" your animal at the ticket counter, some require you to check them at the gate, and others still require you to take them to the cargo area. Again, finding this out ahead of time will alleviate some pressure at the airport. Airlines must also adhere to USDA-APHIS guidelines for holding areas (temperature, lighting, etc.) for animals before and after the flight.

Interestingly enough, the provisions of the AWA apply only to animals shipped as cargo and not to animals carried on board in the cabin. However, it is still best to consult with the airline even before bringing a carry-on pet aboard.

Again, airlines don't have to carry animals if they so desire, and, even if they do, they can refuse to carry them for any reason.

Pet Travel Requirements

APHIS has some requirements for people who want to travel with their pets which should make the experience less traumatic for all involved.

- Age. Dogs and cats at least eight weeks old and weaned.
- Kennels. Meet minimum standards for size, strength, sanitation, and ventilation.
- Size and Strength. Enclosed but allowing enough room for the animal to sit, stand, and lie in a natural position. Easy to open, strong enough to withstand the normal rigors of transportation, and free of objects which could injure the animal.
- Sanitation. Must have a solid, leakproof floor covered with litter or an absorbent lining. Ventilated subfloors are allowed as long as the floor beneath them are solid. Materials like pegboard are not allowed as kennel floors.
- Ventilation. Must be well-ventilated with openings that make

up at least 14% of the total wall space of the kennel. One-third of those openings must be in the top half of the kennel. The kennel must have rims with at least a three-quarter inch clearance to keep other cargo from blocking ventilation openings.

- Grips or Markings. Kennel grips must be positioned so that a cargo loader doesn't have to put his or her fingers inside the kennel to lift or move it. Kennel must be marked either "live animals" or "wild animals" as appropriate and have directional arrows to indicate the proper positioning of the kennel, i.e., which way is up. That lettering must be at least an inch high.
- Animals per Kennel. Separate kennels for each species carried, unless you're carrying compatible cats and dogs of a similar size. Otherwise, two puppies or kittens under six months old or under 20 pounds each per kennel—again of a similar size. (If you're interested, you can put up to 15 guinea pigs or rabbits per kennel or 50 hamsters!) Individual airline requirements may be more restrictive than these, so check first.

Feeding and Watering

If the trip extends up to and beyond 24 hours, you must include instructions on feeding and watering your animal, and those instructions must be on the kennel. You might want to attach such instructions on the kennel anyway in case your flight is delayed, or you miss a connection and your pet travels on without you. You'll have to document that you offered the animal food and water within four hours before the flight. If the animal did feed and drink, then you have to include the time in that documentation.

One solution is to put food and watering implements in the kennel itself so that the animal can sate itself when needed. If you opt to do this, these dishes or implements must be securely attached to the kennel and accessible to airline personnel without their having to open the kennel. If kittens or puppies are eight to 16 weeks old, they need to be fed and watered every 12 hours. Adult animals have to be fed every 24 hours and watered every 12 hours.

Other Helpful Hints

- At the ticket counter, gate, or cargo facility is not the place to find out that the animal refuses to enter the nice, appropriately sized and equipped kennel you've just purchased. Domesticated animals can be finicky, and I have not-so-fond memories of loading horses for their first ride in a trailer. Well before your trip, get the animal accustomed to the kennel for increasingly longer intervals until you work up to the length of the flight. Some animals like show dogs and cats are accustomed to portable kennels almost from birth, and they are good travelers, but if this is Spot's or Kitty's first exposure to a kennel, you'll need to acclimate the animal. Helpful in this acclimation is leaving the kennel open in your house with a favorite toy inside.
- When you make your trip reservations advise the airline right then that you'll have an animal with you. Some airlines claim it is unsafe to transport animals in hot weather, so they have a summer pet embargo. It's best to know ahead of time, if Fido can come with you.
- Call 24 to 48 hours before the flight to confirm your airline reservation has the animal notation. Such notations do get lost. Even then, mentally prepare yourself that your animal may not arrive on the same flight as you do, depending upon cargo space.
- Have plenty of time to spare at the airport, whether you're checking the animal as cargo or carrying it on board. Last minute accommodation of an animal can strain everyone's nerves, including the animal's. Again, check with the airline first, particularly if you have to check the animal at the cargo terminal. Find out how long before your flight you should arrive, and the earlier the better.
- Use direct flights whenever you can to avoid accidental transfers or delays in meeting up with your pet at the end of the flight.
- Whenever possible, travel on the same flight as your pet. Again, the airline may make the decision to ship your animal on a different flight arriving before or after yours—unfortunately, they may not tell you that until you arrive.
- Boxers and bulldogs with their pug noses and restricted breathing passages are more susceptible to breathing problems during transport.
- Early morning or late evening flights are best in the summer, and holidays are not the greatest time to travel with a pet.
- Bring a leash so you can walk your pet before it's checked and after arrival. Keep the leash with you. If you put it in the kennel it could get lost or chewed up because Fido's not happy to be where you've put him. If you've carried the pet into the cabin as carry-on, at no time take the pet out of the kennel. The airline likely prohibits it, and think about your fellow passengers. For the same courtesy, nor should you take your pet out inside the terminal.
- Your pet should have a sturdy collar and at least two identification tags with your permanent address and telephone number plus an address and phone number where you can be reached while traveling. Also put this information on the exterior of the kennel.
- As part of that pre-flight checkup with a vet, have your pet's nails clipped. This can

help keep them from getting snagged in the kennel or ventilation openings.

- Carry a current photo of your pet, which will help in a search if the unfortunate happens.
- If you have a complaint about how the airline treated your pet in transport, make sure they know about it, but also contact USDA-APHIS.
- If your pet gets lost in transit, immediately report it to airline personnel. This can be a very emotional event, to be sure, but keep your head about you and realize that the airline personnel are just as concerned as you are—some of them have pets, too. If your pet has been checked into cargo holds, the automatic tracking system will assist in locating it—you'll get a receipt similar to those for your checked baggage, so hold onto it. If the animal is not located at your point of arrival or if the airline's tracking system cannot locate it, unfortunately, the rest is up to you, i.e., contacting local animal shelters and humane societies. Also contact the APHIS Animal Care regional office closest to you, and always have a complete description and photos of your pet available to help other entities in their search.

Conclusion

Having been raised on a farm and taught that we humans are ultimately responsible for the care and feeding of domesticated animals, I'm not so certain I would subject my pet, especially an aged one or one in dubious health, to lengthy travel, even in a car. When you've moving from one side of the country to another, shipping a pet by air may be your only choice. Believe me, I know kennels are expensive when you're gone on extended vacations, and you'll want to impose on neighbors only so much.

Of course, none of what we've outlined here affects the carriage of pets in your own aircraft, although unless the animal is thoroughly "aircraft-broken," you should consider placing it in a kennel in the aircraft to avoid its becoming a safety hazard in flight. Remember as well to include kennel and animal in weight and balance calculations.

Also, Seeing Eye™ dogs or other personal care animals require different handling, and you'll need to check with the airlines to determine how each one deals with this type of situation. Remember, these are usually working dogs and not pets, so different requirements may apply.

Lastly, if you're shipping a valuable animal such as a show dog or cat whose potential breeding fees represent a substantial loss of income if something happens to the animal, take out some insurance on the animal before the flight.

As with anything in aviation, the carriage of your pet requires extra attention and careful planning. Work with the airline, and everyone should arrive safe and sound with tails wagging.

APHIS Contacts:

World Wide Web:
www.aphis.usda.gov/travel/pets.html

E-Mail: ace@aphis.usda.gov

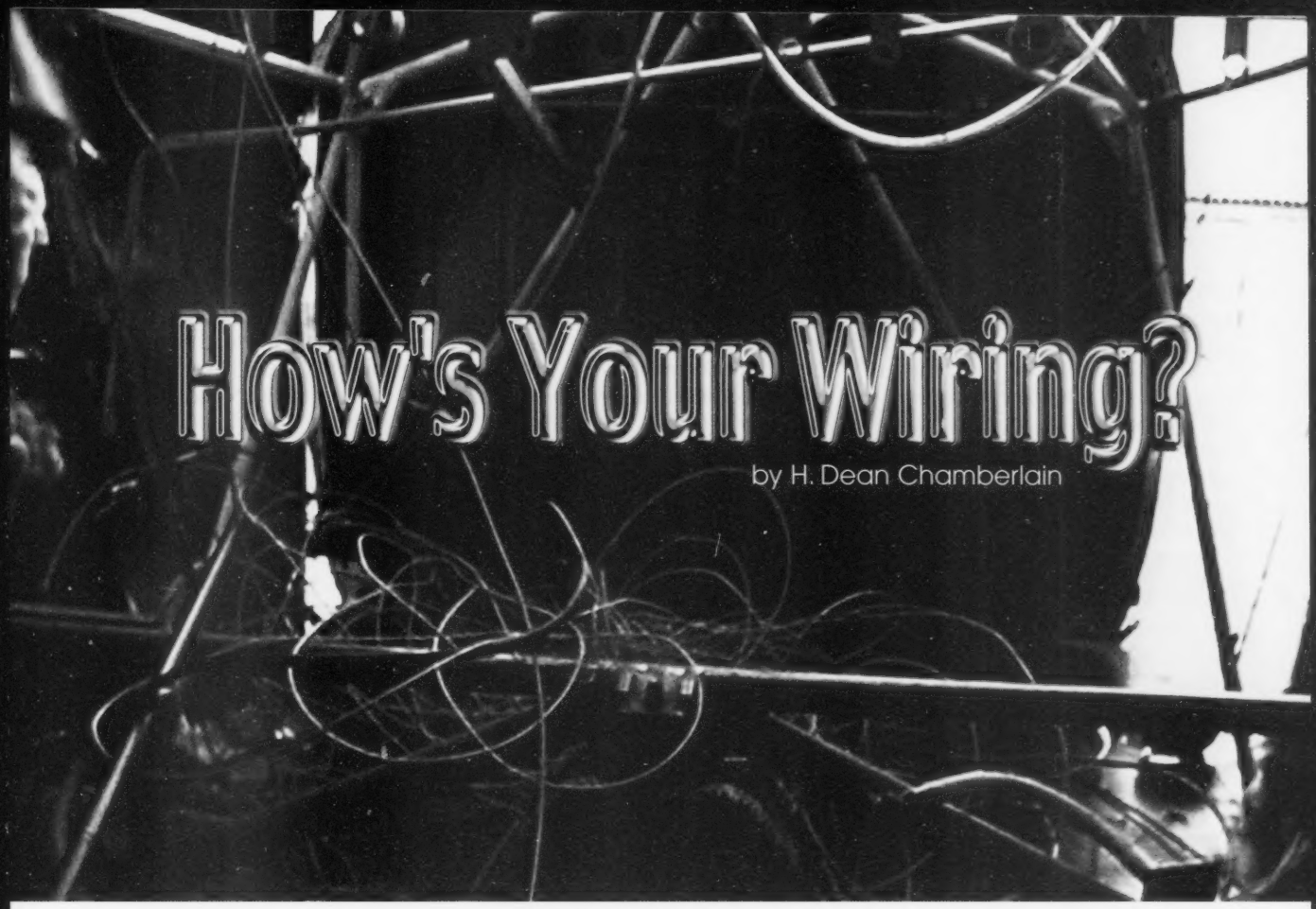
Telephone: 1-800-545-USDA (automated, requires a touch-tone phone to make menu selections)

Mail:
Deputy Administrator
USDA-APHIS-Animal Care
4700 River Road, Unit 84
Riverdale, MD 20737-1234
(301) 734-7833

Regional Offices:
Eastern Region
USDA-APHIS-Animal Care
920 Main Campus Drive
Suite 200
Raleigh, NC 27606-5210
(919) 716-5532

Central Region
USDA-APHIS-Animal Care
P.O. Box 915004
Fort Worth, TX 76115-9104
(817) 885-6923

Western Region
USDA-APHIS-Animal Care
9580 Micron Ave., Suite J
Sacramento, CA 95827-2623
(916) 857-6205



How's Your Wiring?

by H. Dean Chamberlain

If your neighbor walked up to you and asked, "How's your wiring?" You might begin to wonder about your neighbor's sanity. However, if your aircraft's mechanic asked the same question, you might want to stop and answer the question.

No, this writer has not lost his mind—although some question if he ever had one—but all joking aside, this is an important safety issue for both general aviation (GA) and air transport category aircraft. After reviewing comments about two transport category aircraft accidents, TWA Flight 800 on July 17, 1996, and Swiss Air Flight 111 which crashed off Nova Scotia on September 2, 1998, and then completing the FAA's Aircraft Certification Services online Aircraft Wiring Practices (Job Aid), this writer believes owners of GA aircraft need to be aware of the issues surrounding both of these accidents and the potential problems that have been identified as a result of the accidents that are applicable to general aviation aircraft.

The TWA aircraft broke up in flight after an explosion believed caused by the center wing fuel tank. The aircraft had just taken off from New York's JFK Airport en route to Europe. The electrical wiring in the fuel tank is believed to have been the ignition source for the explosion. In the case of the Swiss Air flight, smoke in the cockpit and fire damage in the overhead cockpit and overhead first class area is believed to have been caused by an electrical fire.

These accidents caused FAA to take action involving both fuel tank design and the types of insulation used in aircraft.

If you think these problems are limited to aging transport category aircraft, you need to remember the average age of the general aviation fleet is approaching 30 years of age. My own aircraft that is being upgraded with new wiring was made in 1953. It is old enough to be a baby boomer. It was time to replace the old wiring as it was undergoing a major equipment upgrade. Some of the removed wiring was original dating back to 1953. The question is how old is the wiring in your aircraft?

At your next annual inspection, you might to ask your mechanic to give you a report about your aircraft's wiring condition. Although I happen to like reading FAA Advisory Circular (AC) 43.13-1B, I realize not everyone has read the book or wants to read the manual. For those who have never seen a copy, the AC explains the FAA's recognized methods of working on aircraft. The value of the AC is it provides the non-technical aircraft owner the opportunity to review what are acceptable aircraft maintenance techniques.

For those who have no interest in reading a detailed maintenance technique manual, enter the 164 slide PowerPoint™ presentation titled FAA Aircraft Certification's Aircraft Wiring Practices (Job Aid) at <www.academy.jccbi.gov/airdl/wiringcourse>. The job aid was designed for FAA en-

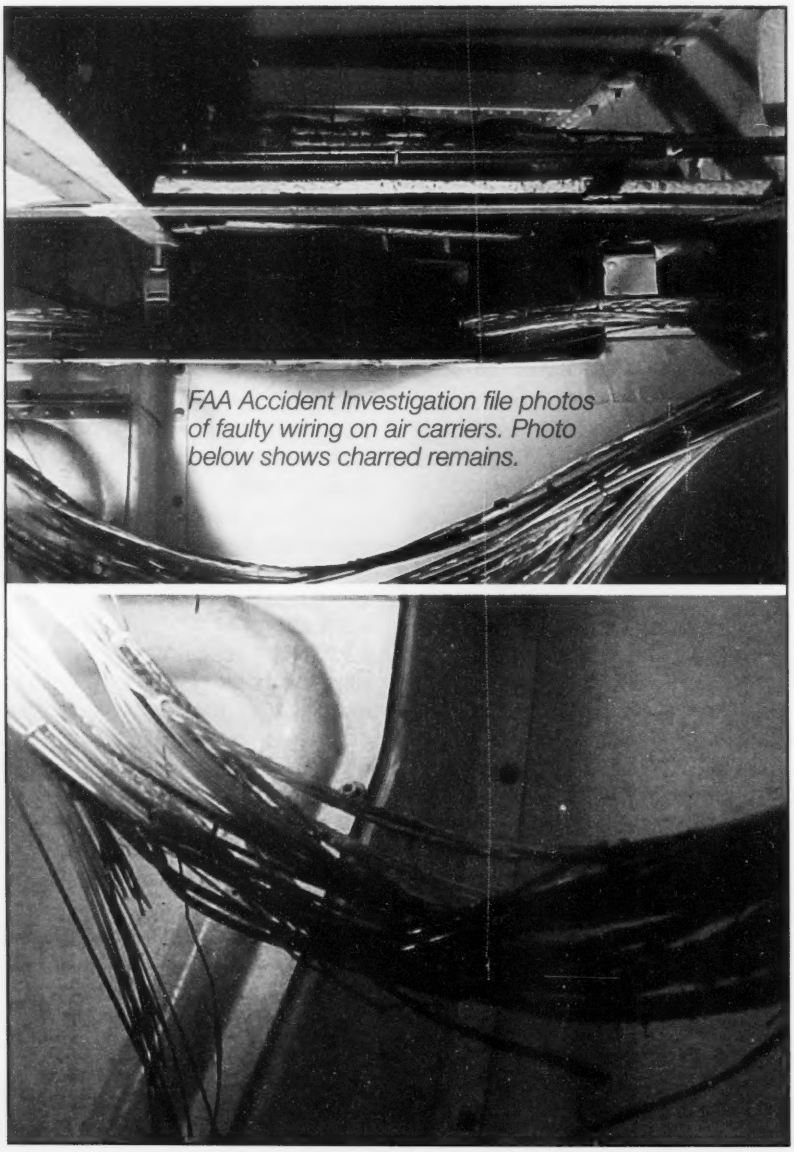
gineers and aviation safety inspectors.

According to the site, the job aid covers applicable 14 Code of Federal Regulations, policy, industry wiring practices, primary factors associated with wire degradation, information on type certificate/supplemental type certificate data package requirements, wire selection and protection, splicing and termination practices, wiring maintenance concepts, including how to perform a wiring general visual inspection, and the job aid includes numerous actual aircraft wiring photos and examples.

Briefing notes are included to help explain the slides. The briefing notes are designed to help someone give the slide presentation to a group of people. They also help explain the slides for those who may not be subject matter experts in wiring practices.

I think the job aid is a good overview of FAA recognized wiring practices that can benefit the typical GA aircraft owner. Since the slide show contains examples of recognized good and bad wiring practices, they provide the non-technical aircraft owner or pilot a means to recognize potentially unsafe wiring in an aircraft.

Are we trying to make a non-qualified person an electrical expert in 164 slides? No. Can the 164 slides help a non-expert identify a possible wiring problem? *FAA Aviation News* thinks so.



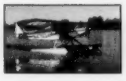
FAA Accident Investigation file photos of faulty wiring on air carriers. Photo below shows charred remains.

Looking at my own aircraft and looking at similarly aged aircraft, the title of one of my favorite movies comes to mind, "The Good, The Bad, and The Ugly." As various modifications have been made to many GA aircraft over the years, I think it is safe to say some of the work has been good; some has been bad, and some is simply ugly. I also think it is safe to say the more complex the aircraft and its systems and its electrical and electronic installation and components, and the more complex its wiring; the uglier the wiring situation may become as the aircraft ages.

If you doubt this observation, when was the last time you looked behind your instrument panel or behind the bulkhead panels hiding your aircraft's wiring? You might be surprised at what you may find. Does the wiring meet the guidelines outlined in the slide show?

To avoid being surprised, you just might want to review the Aircraft Wiring Practices (Job Aid) and then inspect your aircraft. Or you might want to wait until your next annual inspection or whenever your aircraft is scheduled for maintenance and ask your mechanic to review your aircraft's wiring with you. After all, you will have reviewed the recommended ways to secure wiring through bulkheads, seen the proper way to secure wiring in clamps, read how to recognized hot or burnt wiring, and reviewed the proper way to check terminal blocks and other FAA recommended safe wiring practices. You might even impress your mechanic with your newfound knowledge. Just remember that a little knowledge can be dangerous. So before you decide to rewire your entire aircraft next weekend by cutting and slicing your way through its ugly wiring, you might want to ask your mechanic for his or her advice before you start. However, a wiring upgrade may be something to add to your next maintenance check.

Have a good weekend. By the way—how is your wiring?



Attitude Control

Keeping your voice in check helps you manage the difficult student

by Tom Gilmore

Your young primary student is struggling with holding altitude and heading. You wonder if the pain of all those facial piercings is distracting him, because he certainly doesn't seem to be listening to you. One moment he exhibits a flash of natural talent, and the next it's as if he's never flown before. How will he ever make it to the airlines, like he claims he wants to?

Before you lose your cool, stop and think for a moment.

In our business, working with the public means dealing with many different personality types. Advertising your services as a CFI means you accept the challenge of training any potential student, including the Top Gun type, the meek, and the stubborn.

We deal with complex individuals—a wide envelope of both dress and personalities. As flight instructors, we can be confronted with students who act indifferent or casual in their attempt to learn to fly, but perhaps they are truly gifted once we get them in the aircraft.

No matter how well we handle the wide range of personalities, we occasionally find ourselves confronted with a difficult situation. The resulting clash is sometimes the reason we lose a good student. While we could guide them to another flight instructor, we should stop and consider why we wanted to become a professional flight instructor in the first place. As such, our goal is to teach our students the joys and rewards of learning to fly by using a concerned and patient approach. That includes dealing with the challenging students and watching them progress without giving up. Often, that takes work on our performance, too.

As flight instructors we're paid to provide quality training with a touch of diplomacy and a dash of patience when our difficult students need constant coaxing. So how do we work and train them without losing our cool? It takes understanding and concentration—and it takes attention to keeping our attitude under control.

To prevent an explosive event in the cockpit with a student, never show a loss of patience that causes you to raise your voice in anger. A sense of humor has saved me from this bottomless pit many times. Most situations can be made light of, with the obvious exception of an in-flight emergency.

When a student is screwing up and there seems to be no end in sight to his or her misery of endless mistakes, take a breather. Try another task, just fly for fun, or dig into your bag of tricks and come up with another angle for teaching the skill. I remind myself the student is not messing up on purpose, and that helps diffuse my frustration. Students need frequent reassurance that they are still in the learning process and are going to succeed. It just takes time and practice. If you show anger in the cockpit at your student's lack of understanding or performance, you are attacking the student personally. He or she will avoid the next flight lesson—and you—like the plague.

Even the best and most patient flight instructor can come to the end of his or her rope at times, and I confess I'm not the most understanding or patient husband or father. However, when I climb into the cockpit to give dual instruction, I work on the edges of the patience envelope. I want to have fun in this business while providing quality training. I know that getting upset in the cockpit with a student won't cut it.

Before the days of the ANR (active noise reduction) headsets and intercoms, a flight instructor might yell to make a point. Those days are gone. Today, we can't use the excuse that we have to speak loudly to be heard above the engine and slipstream noise. If we are yelling, we are probably losing our patience, especially in the eyes of our students.

Nonetheless, a firm voice is still a required tool of a CFI that is in command. Indecisiveness has killed many pilots. Sometimes we need to speak in a firm voice to let our left-seat trainee know we mean business. We should use this as a nudging tool with the reluctant student when the situation demands immediate action.

Our personal skills with our students are just as important as our flying skills—those are what make us professional teachers. By keeping our cool and controlling our voice, we are more able to achieve our goals in the cockpit, even with a frustrating student. The next time you feel you are being stretched to the limits of your patience, tell your aspiring trainee that the small airport at the three o'clock position serves great coffee. A simulated emergency landing setup to the field might be in order. After all, your student probably feels like taking a break, too.

Tom Gilmore is a NAFI Master CFI. This article is reprinted with permission from the NAFI Mentor.

Safety First:

Stress

by Patricia Mattison

Stress is a normal part of most folk's lives. Most of us have felt stressed to the limit at one time or another. Stress can be good or bad depending on the situation. Stress plays an important part when it comes to sorting out priorities. A temporary loss of the ability to think out things clearly and completely can be caused by stress. My husband goes through a stressful, yet thankfully temporary, mental lapse every time he loses his car keys. He starts out calmly looking for the keys, but, when he can't find them where he thought they should be, he begins to run around the house looking for them. Stress has taken over and panic is about to commence.

Now granted the lost key episode is just an example of how most of us act when things don't go quite as planned. We have all had stressful moments in our lives. Unless, that is, you live in a closed environment with no contact from the outside world. In the realm of flying, calmness usually prevails. Every so often, however, chaos reigns supreme. It is said that flying is hours and hours of absolute boredom interspersed by moments of sheer panic.

If you have ever piloted an aircraft you can relate to the above. If outside stresses are at work when a problem arises, it becomes difficult to sort out the correct solution. Reason and logic are necessary for a successful outcome in any situation.

A while ago a pilot had decided to take a trip that required flying over some relatively high mountains. He was flying his twin-engine airplane and so was familiar with the aircraft and the related systems. A short period of time had passed since takeoff and the pilot was over a series of hills that were at the base of the mountains. He had had a restless night with little or no sleep.

The flight that day was one of many that he had taken for his business. He felt that he had to go even though he was stressed because of his commitment at the destination. The stress he was feeling was magnified by his lack of sleep. He had his wife on the flight, which also added to the stress level. He wanted the flight to be perfect for her sake. Encountering weather, he hesitated to turn back because of his commitments.

The plane entered a limited visibility situation and impacted the top of a mountain along the route. Stress beyond belief became a panic attack for the pilot. His wife was injured and he had to find help. He left her alone and went to find a road and somebody to help her. By the time he had returned to the crash site his wife had died as a result of the accident. She hadn't been wearing a seatbelt and had impacted the yoke of the airplane.

The stresses that had built up prior to the flight—lack of sleep and the drive to make a business commitment—combined to interfere in the decision making process.

This pilot had a serious accident, which resulted in the loss of his wife. Small stresses had combined to interfere with the orderly construction of the thought process necessary to avoid getting into a bad situation. There are many examples of poor decision making brought on by life's stresses.

Look at yourself carefully for signs of stress before making any flight. Have there been any stressful events in your life that might impact the safety of your flight. If you see that there are, postpone the flight until a time when life is less stressful.

Patricia Mattison is the Safety Program Manager at the Juneau Flight Standards District Office, AK.

The Alaska Capstone Program: Increasing Safety Through Technology

By Kevin W. Williams, PhD

In the southwest corner of Alaska, centered around the small town of Bethel, lies one of the largest laboratories in the world. This laboratory is not a building but consists of approximately 40,000 square miles of land and its accompanying airspace [at 58° to 64° N and 155° to 167° W], in an area known as the Yukon/Kuskokwim (or Y/K) delta.

Within this laboratory the Federal Aviation Administration is conducting an ongoing experiment aimed at testing new avionics technology for general aviation (GA) aircraft. Participants in the experiment, which is called the Alaska Capstone Program, are pilots and flight companies in the Y/K delta. Approximately 187 transport category and GA aircraft have been equipped with the advanced avionics equipment.

Capstone's Objectives

The purpose of this program is twofold. The first is a test of whether or not the technology can improve flight safety in Alaska by providing better information to the pilot regarding terrain, traffic, and weather in the vicinity of the aircraft. The second is to test the new avionics in a relatively controlled environment to aid in the transition of the technology to the entire country. Both aspects of the experiment are assisted by Human Factors scientists from the Office of Aerospace Medicine, at the Civil Aerospace Medical Institute (CAMI) in Oklahoma City.

Flight Safety in Alaska

A look at some basic facts regarding flight safety in Alaska demonstrates the need for improved safety. The following facts were released recently by the Alaska Capstone Program Office in Anchorage, Alaska:

- One out of every 58 people in Alaska is a pilot
- There are six airplanes for every 10 pilots in Alaska
- There was an average of one aircraft accident every other day in Alaska during the past 10 years
- There was an average of one aviation fatality every nine days in Alaska during the past 10 years
- Of the commercial pilots that spend their 30-year career flying in Alaska, more than 11% will perish in their aircraft, as compared to 2.5% of the pilots in the other 49 states.

Improving flight safety in Alaska is of major importance to the FAA. If the technology being tested under the Capstone program can accomplish this goal in Alaska, it will pave the way for implementation on a nationwide basis.

Automatic Dependent Surveillance – Broadcast

The capabilities being offered to the GA community under the Capstone Program have only been generally available before to commercial airlines and high-end GA aircraft. The ability to see traffic and weather on a cockpit display is usually provided by expensive onboard detection systems. To provide such capabilities in a less expensive manner, a ground- and satellite-based infrastructure was created called Automatic Dependent Surveillance - Broadcast, or ADS-B. Unlike radar systems, which bounce radio waves off of airborne targets and then interpret the reflected signal, ADS-B relies on position information that is transmitted by each individual aircraft based on global positioning system (GPS) technology.

Each ADS-B equipped aircraft broadcasts its precise position in space via a digital datalink, along with other data—airspeed, altitude, and

whether the aircraft is turning, climbing, or descending. This information can be transmitted directly from one aircraft to another, or it can be transmitted to a ground station, combined with other aircraft data, and re-transmitted back to any aircraft within range of the ground station. The information can also be transmitted by land lines or other means to air traffic controllers in distant locations.

ADS-B allows pilots in the cockpit and air traffic controllers on the ground to "see" aircraft traffic with much more precision than has ever been possible before. Unlike conventional radar, ADS-B works at low altitudes and is effective in remote areas or in mountainous terrain where there is no radar coverage, or where radar coverage is limited.

Flight Information Services – Broadcast

In addition to information related to other aircraft, other types of information can be broadcast from ground stations to Capstone-equipped airplanes. Flight information services include graphical weather depictions, as well as text-based weather and other information such as *Notices to Airmen* (NOTAM). Since weather plays a major part in many aircraft accidents in Alaska, the availability of current weather conditions, presented in an easily interpreted graphical format, is expected to be of great help to Alaskan pilots. The graphical depiction of NOTAMS, showing, for instance, that a runway has been closed at a particular airport, should also make it easier for pilots to maintain awareness of important information both before and during their flights.

CAMI's Role

Human Factors scientists from CAMI have been assisting in the Capstone Program for several years [along with other FAA and NASA human factor scientists]. CAMI scientists participated in the team that selected which set of avionics would be used in the Capstone Phase I Program, developed criterion measures for use in demonstration flights of the selected avionics, and developed and assisted in the administration of performance measures of the equipment.

CAMI scientists currently participate as members of the Safe Flight 21 Human Factors Team in the collection of data from the Bethel region. Members of the team have conducted personal interviews with Capstone pilots, administered questionnaires, and flown on observation flights during actual day-to-day operations of the Capstone equipment.

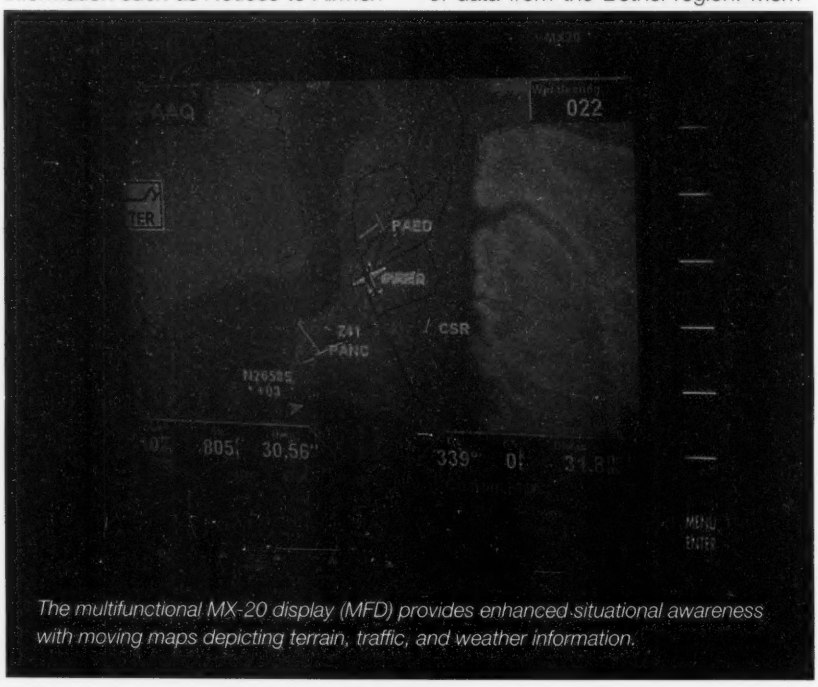
Experiments are also under way to collect both objective and subjective data regarding the use of Capstone equipment under various environmental and workload conditions. CAMI's two flight simulators are being equipped with Capstone avionics for use in the conduct of these investigations.

The Future

The second phase of the Capstone Program is about to begin in the southeast portion of Alaska, centered around the Alaskan state capitol of Juneau. Capstone Phase II will include both a multi-function display and an optional highway-in-the-sky display as part of its avionics package. Another 150 GA aircraft, both fixed-wing and rotary, will be equipped with the Phase II avionics.

While the primary focus of the Capstone Program is on increasing flight safety in Alaska, the Safe Flight 21 Human Factors Team is looking at the program as a proving ground for these new types of avionics. A thorough human factors assessment of the instrumentation and procedures will ensure that the pilot/aircraft interface is optimized for safety of flight—wherever that flight will occur.

It is expected that, in the near future, these avionics systems, as well as the ground infrastructure to support them, will be seen in the lower 48 states, and eventually around the world. What we are seeing in the Capstone Program is the start of a paradigm shift in general aviation cockpit displays. The CAMI scientists supporting this effort are excited to be a part of this event.



The multifunctional MX-20 display (MFD) provides enhanced situational awareness with moving maps depicting terrain, traffic, and weather information.

Dr. Williams is a research scientist with the FAA Civil Aerospace Medical Institute's Human Factors Research Laboratory. This article originally appeared in the Spring 2002 issue of the Federal Air Surgeon's Medical Bulletin.

• Desert Flying

Well done! That was one of the most competent and detailed stories about that subject. [Referring to the May/June 2002 article, "Keeping Safe in the Desert. "]

A. Sutter (ATPL/Swiss)
Via Internet

Thanks for your kind comments. Fortunately, the FAA Aviation News *staff was able to work with many knowledgeable persons who willingly contributed to this article. They also deserve your thanks and ours.*

FAA AVIATION NEWS welcomes comments. We may edit letters for style and/or length. If we have more than one letter on the same topic, we will select one representative letter to publish. Because of our publishing schedules, responses may not appear for several issues. We do not print anonymous letters, but we do withhold names or send personal replies upon request. Readers are reminded that questions dealing with immediate FAA operational issues should be referred to their local Flight Standards District Office or Air Traffic facility. Send letters to Dean Chamberlain, FORUM Editor, FAA AVIATION NEWS, AFS-805, 800 Independence Ave., SW, Washington, DC 20591, or FAX them to (202) 267-9463; e-mail address:

Dean.Chamberlain@faa.gov

• Blowing The Whistle

Thank you for including "Blowing The Whistle" in *FAA Aviation News*, March 2002 Forum, and your response thereto. I "dare not" become deeper involved and therefore must leave it up to you to pursue this matter further. The airport ID is 15G, Wadsworth, OH. Smith => Weltzien, Skyport => Skypark, Stick => Saltshaker, a prominent Silo (grain elevator)

Monitoring CTAF on 123.00 MHz will confirm the accuracy of my report.

"Joe Friday"
Via email

The above information was forwarded to the Cleveland (Ohio) Flight Standards District Office. The office's Safety Program Manager addressed the group that flies out of the airport. According to her, they are a flying community with a very active local safety program. She and the local designated pilot examiner (DPE) added segments to safety meetings regarding the situation. She said the group in general was very receptive and the pilots are attempting to make adjustments in their radio phraseology.

The airport has just been named an Ohio Historic Landmark, as one of the earliest flying communities in the state.

• RNAV Approaches With VNAV

The following information was taken from the FAA newsletter published for the examiner, designee, and instructor communities. The quarterly newsletter, Vol. 14, No. 3, was dated July 2002.

RNAV (GPS) approaches such as the RNAV (GPS) RWY 6 approach at Birmingham are becoming very common today. Every revision of the instrument approach procedure (IAP) charts has several new RNAV (GPS) charts included. Since June, 2001 some of these RNAV (GPS) approaches also have vertical navigation (VNAV) minimums that are significantly lower than the lateral navigation (LNAV) minimums.

The problem is that many pilots have only started to learn the basic GPS approach and have never heard of the VNAV approach that gives true vertical guidance. In fact, their GPS unit may have a VNAV function so why can't this be used for the VNAV approach? I have visited with 10 professional pilots and 25 instrument or instrument instructor pilot applicants and only one of the professional pilots even knew what I was talking about. The rest assumed they could use the lower minimums (that actually require the use of VNAV vertical guidance) with their basic GPS equipment that are certified only for LNAV approaches.

The RNAV (GPS) RWY 6 approach at Birmingham is an example of an approach where you must know your minimums and the limitations of your equipment.

The VNAV minimums are 360 feet lower than the LNAV minimums (MDA) and are 109 feet lower than a prominent obstruction that is only about three miles from the end of the runway.

The only equipment legal and safe to go down to the 940 foot decision altitude will have a statement in the *Airplane Flight Manual* (AFM) or an AFM supplement explicitly stating the RNAV system is certified for IFR VNAV approaches. This VNAV equipment will have glide slope information displayed on the HSI much like an ILS approach. The VNAV function of a non-approved VNAV GPS will tell you the descent rate necessary to go from where you are to where you want to go, but it will never tell you that descent rate might take you right into an obstacle. It can not show if you are below the required glide path.

The FAA Advisory Circular AC 90-97, Use of Barometric Vertical Navigation (VNAV) for Instrument Approach Operations Using Decision Altitude (http://terps.faa.gov/directiv/AC90-97.pdf), covers the requirements and operation of the VNAV portion of these approaches. Briefly, the requirements are:

1) Approved FMS System where GPS is an active component.

2) RNP system approved for RNP 0.3 NM Operations in IFR conditions.

3) Barometric VNAV capability.

4) Database includes the waypoints, VNAV angles and altitudes that pertain.

5) A temperature below the limits for a particular approach requires that you descend only to the LNAV MDA.

6) You must select the appropriate VNAV mode - Vertical speed is not acceptable for VNAV approaches.

7) A current altimeter setting for the landing airport is required.

The RNAV (GPS) approaches with VNAV are marvelous approaches with great accuracy and lower minimums. There will be many more of them in the very near future. They will be available in remote areas and require only a local altimeter setting for equipment on the ground. Pilots just need to be absolutely sure that they know how to do the procedure correctly.

Here is a link to the approach chart: <http://download.aopa.org/iap/20020418/se4of4/bhm_rnav_gps_rwy_6.pdf>.

Editor's Note: This article was provided the newsletter from a designated pilot examiner from Des Moines, IA.

• Taping Radio Traffic

I would like to know if it is legal in the United States for me, a private citizen, to make tape recordings of radio communications between aircraft and ground controllers.

John Zenger
Washington, DC

According to the Federal Communications Commission (FCC), it is legal to tape record transmissions between aircraft and ground controllers because these are public frequencies

• Desert Survival Addendum

I read with interest the recent issue of *FAA Aviation News* that had the article on desert safety in it. There is an item that was left off the list of essential survival equipment and rescue aids. That is a roll of toilet paper. You might think I am kidding you, but I remember having read here and there over the years of people who unrolled a roll of toilet paper on the ground to make a cross—say about 50 feet long—which seems to be easily visible from the air. It seems that 50 feet each line of the cross would be prominent feature from say 2,000 feet, or whatever altitude search and rescue missions fly at—more visible than wreckage. Perhaps you would want to revise the length of the cross since I am guessing at this.

Wil Bentley
Occidental, CA

The length would probably depend in the area you want to mark. Thanks for the suggestion.

MARION C. BLAKEY NEW FAA ADMINISTRATOR

Marion Clifton Blakey was sworn in September 13, 2002 as the 15th Administrator of the Federal Aviation Administration. As Administrator, Blakey is responsible for regulating and advancing the safety of the nation's airways as well as operating the world's largest air traffic control system. Prior to being named FAA Administrator, Blakey served as Chairman of the National Transportation Safety Board.

During her tenure as Chairman, Blakey managed a number of accident investigations including the crash of American Airlines flight 587. Blakey worked to improve the Board's accident reporting process and increased industry and regulatory responsiveness to NTSB safety recommendations. Additionally, Blakey strengthened the Board's advocacy and outreach programs to promote safer travel throughout all modes of transportation. She also furthered development of the NTSB Academy as a national and international resource to enhance aviation safety and accident investigations.

At the FAA, Ms. Blakey, continues a long career of public service. In addition to NTSB Chairman, Blakey has held four previous Presidential appointments, two of which required Senate confirmation. From 1992 to 1993, Blakey served as Administrator of the Department of Transportation's National Highway Traffic Safety Administration (NHTSA). As the nation's leading highway safety official, she was charged with reducing deaths, injuries, and economic losses resulting from motor vehicle crashes. Prior to her service at NHTSA, she held key positions at the Department of Commerce, the Department of Education, the National Endowment for the Humanities, the White House, and the Department of Transportation.

From 1993 to 2001, Blakey was the principal of Blakey & Associates, a Washington, D.C. public affairs consulting firm with a particular focus on transportation issues and traffic safety.

Ms. Blakey, born in Gadsden, Alabama, received her bachelor's degree with honors in international studies from Mary Washington College of the University of Virginia. She also attended Johns Hopkins University, School of Advanced International Studies for graduate work in Middle East Affairs.

Administrator Marion C. Blakey

USDA'S WILDLIFE SERVICES APPOINTS FIRST NATIONAL AIRPORTS COORDINATOR

The U.S. Department of Agriculture's Animal and Plant Health Inspection Service, Wildlife Services (WS) program has appointed Richard Dolbeer as its first national airports coordinator to oversee efforts to reduce the threat of wildlife hazards at airports across the United States.

In the last 20 years, growing wildlife populations, faster airplanes, and an increase in air travel have led to a dramatic rise in the number of collisions between aircraft and wildlife at both civil and military airports. Wildlife strikes cost civil aviation in the United States more than $400 million annually. As a scientist at Wildlife Services' National Wildlife Research Center, Dolbeer has spent the last 29 years studying ways to resolve conflicts between wildlife and people, focusing his research during the last 12 years on preventing potentially life-threatening wildlife strikes.

In response to this growing threat, WS has seen a tremendous rise in the number of requests from airports seeking assistance in managing wildlife hazards. Currently, WS airport specialists are working at approximately 400 civil and military airports nationwide to protect public safety by reducing risks posed by birds, deer, coyotes, and other wildlife that reside near airport runways.

As the national airports coordinator, Dolbeer will work to ensure that all of WS airport specialists have the latest technology at their disposal and that all of their recommendations and actions are based on sound science and research. In addition, Dolbeer will work to expand WS hazard management activities to provide much needed assistance at smaller airports that often lack the resources to mitigate wildlife threats.

Through his research and as the current chairperson of Bird Strike Committee USA, Dolbeer is uniquely positioned to take on this new and challenging role for WS, ensuring that the program will continue to lead the way in efforts to prevent wildlife colli-

sions with aircraft.

For more information, you can contact Mr. Dolbeer's office at (419) 625-0242.

NEXT GENERATION DOPPLER WEATHER RADAR FOR ATC

As part of its continuing efforts to modernize the national airspace system, the FAA has installed a system at air traffic control facilities that will bring highly accurate weather information directly to controller displays. For the first time ever, advanced Doppler weather information will be displayed directly to air traffic controllers on the same screen as aircraft position data.

The Weather and Radar Processor (WARP) will enhance safety by allowing controllers to reroute air traffic to avoid areas of severe weather. Air traffic controllers at the Fort Worth, TX, Center have started to use WARP on their displays.

FAA recently replaced outdated controller displays with state-of-the-art equipment. The capabilities of the new display systems enable WARP to provide real-time aviation weather data on the same screen as aircraft position data, using different colors to show varying intensities of precipitation.

WARP also shows precipitation at three different altitudes, allowing controllers to concentrate on the weather appropriate to the precise location and altitude of a particular aircraft. The weather information is shown as background graphics to the aircraft data on the display. This configuration gives the controller a more accurate view of localized precipitation and supports quicker evaluation of the current weather's impact on a particular airspace sector.

FAA'S ALASKAN WEBCAMS

In an effort to reduce aviation accidents in Alaska, the FAA has installed two dozen webcams, with more planned, to supplement traditional aviation weather reports. The real-time images of mountain passes, rocky coasts, and remote villages can be viewed by anyone on the FAA web site <http://akweathercams.faa.gov/wxcams/map.php>. The web site shows not only the real time cam images, but also images for the past six hours, and what the clear day image is. In some cases the clear day images are marked with the elevation of nearby mountains and distances to local landmarks to help pilots estimate visibility.

The weather cams were employed to help pilots flying in Alaska in their go/no-go decision-making process. According to statistics there is at least one aviation accident everyday and one fatal crash every 10 days. The FAA's goal is to reduce aviation accidents in Alaska by 50 percent over the next 10 years. The success of these weather cams may lead to their use elsewhere in the U.S.

CALENDAR OF EVENTS

January 17-19, 2003
Great Lakes International Aviation Conference
East Lansing, MI

A weekend of training sessions for pilots, mechanics, students, instructors, plus a historical display chronicling the Great Lakes Region's contribution to aviation at the Kellogg Hotel and Conference Center. Also featured will be an optional one-day IA renewal training. For more information, call (517) 335-9880 or visit their web site at <www.greatlakesaviationconference.com>.

March 20-22, 2003
14th Annual International Women in Aviation Conference
Cincinnati, OH

The theme this year is "Celebration of Flight: Saluting the Past, Embracing the Future." The WIAI Annual Conference includes exciting educational, networking, and career-enhancement opportunities. For more information, visit their web site at <www.wiai.org>.

March 21-22, 2003
5th Annual Southwest Aviation Trade Show and Symposium
San Antonio, TX

This event will be held at Hallmark Jet Center, Hallmark Institute of Aeronautics, San Antonio International Airport. It will feature representatives of leading aircraft manufacturers, repair stations, engine companies and avionics/instrument manufacturers and a host of other aviation-related businesses. This program is provided for pilots and aviation maintenance professionals. For more information visit the web site at <www.swaviation.org>.

Editor's Runway

from the pen of Phyllis-Anne Duncan

Final Approach

Now that the moment has arrived to put my thoughts in print, I fear that words will fail me. Those of you who've provided feedback on "Editor's Runway" or who have read it for the past few years know that I'm seldom at a loss for words. Today might be a day to mark on the calendar because putting this in "black and white" makes it reality.

This is my last Editor's Runway for *FAA Aviation News*. The time has come to move on to another challenge, one perhaps not so fulfilling and not so much part of my psyche as this magazine is. *FAA General Aviation News*, as it was called back in 1979, was my first job in the FAA and the jumping off point for a 23-year career (thus far) which has been the most rewarding experience of my life. Public service was my calling from the cold, January day in 1961 when I sat on my father's shoulders to try and see a young man who told me and others to ask not what my country could do for me, but what I could do for my country. Serving the aviation public and specifically general aviation has been my dream job. I told my father when I got the job back in 1979, "Dad, they're going to pay me to write about airplanes. Can you believe it?" "This is America," was his simple and eloquent reply.

I'll still be with the FAA, just in another office and doing a job which benefits all of FAA's Flight Standards' employees. I'll be shepherding the letters people write to their Congressmen through the bureaucratic maze, assuring that the directives which go out to our inspectors are accurate, and making certain Flight Standards employees have things like telephones and desks and cubicles. It may sound boring, but you haven't seen this place hop on a Friday afternoon when Senator So-And-So's response hasn't been completed yet or when all the "t's" haven't been crossed or the phones go down.

I have loved every single communication from each of the readers or subscribers—even the ones who disagreed with us or who pointed out a typo I missed. It's a cliché to say that the readers are the heart of any publication, and I tried to write to that heart and to produce a magazine which spoke to the heart we shared—aviation. I wanted to think of myself as one of you, that we had shared experiences we could both relate to. For the readers, I wanted to make *FAA Aviation News* as un-bureaucratic as possible. I hope I've succeeded.

I've had an incredible staff these past 11 years I have been the editor. Louise Oertly is the corporate history of the magazine and its conscience. Dean Chamberlain has always had the vision of what we hope to be and could be, i.e., the future. Deidria Shaw has helped me in ways immeasurable, pointing things out and saying, "Did you really mean to say that?" And Mario Toscano. More than the magazine's conscience, future, or vision, Mario is the person who takes my and others' words and makes the magazine a feast for the eyes.

I hope that the next editor continues "Editor's Runway." It has sparked conversation and ideas for the magazine that standard government fare never could. When we first tried an editorial, I was told that government magazines couldn't have opinions. A lot of "Editor's Runway" was my opinion but only what I had learned from pilots and mechanics in the "real world." I tried to give you a voice within the Friendly Aviation Agency.

And parting, as the Bard said, is sweet sorrow. Though I complained about coming up with ideas for this feature, I will miss "talking" with you. General aviation became a part of me from the day I saw my first airplane. Though I'm no longer part of the General Aviation and Commercial Division, I will carry general aviation, *FAA Aviation News*, and all of you in my heart wherever I am. You just have to promise me one thing. General aviation's voice must be heard within the halls of the new bureaucracies set up to ensure our security. Don't let anyone keep you on the ground without justification. That said, I'm lined up on final approach, and it's been a wonderful, 11-year flight. Thank you for letting me be PIC.

Over and out.

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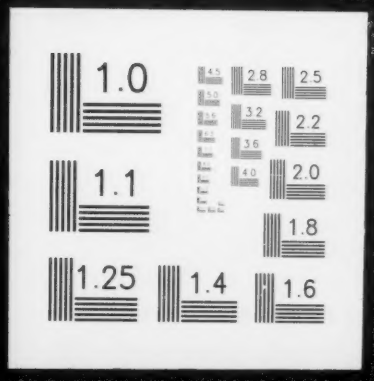
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